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EDITION



Corporate Finance

FOURTH EDITION

Jonathan Berk • Peter DeMarzo



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GLOBAL PORTFOLIO SIMULATIONS

**NYSE • NASDAQ • CBOE • CME
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COMMON SYMBOLS AND NOTATION

A	market value of assets, premerger total value of acquirer	P_i	price of security i
APR	annual percentage rate	P/E	price-earnings ratio
B	risk-free investment in the replicating portfolio	PMT	annuity spreadsheet notation for cash flow
C	cash flow, call option price	PV	present value; annuity spreadsheet notation for the initial amount
$Corr(R_i, R_j)$	correlation between returns of i and j	q	dividend yield
$Cov(R_i, R_j)$	covariance between returns of i and j	p	risk-neutral probability
CPN	coupon payment	r	interest rate, discount rate of cost of capital
D	market value of debt	R_i	return of security i
d	debt-to-value ratio	R_{mkt}	return of the market portfolio
Div_t	dividends paid in year t	R_P	return on portfolio P
dis	discount from face value	$RATE$	annuity spreadsheet notation for interest rate
E	market value of equity	r_E, r_D	equity and debt costs of capital
EAR	effective annual rate	r_f	risk-free interest rate
$EBIT$	earnings before interest and taxes	r_i	required return or cost of capital of security i
$EBITDA$	earnings before interest, taxes, depreciation, and amortization	r_U	unlevered cost of capital
EPS_t	earnings per share on date t	r_{wacc}	weighted average cost of capital
$E[R_i]$	expected return of security i	S	stock price, spot exchange rate, value of all synergies
E, F_T	one-year and T -year forward exchange rate	$SD(R_i)$	standard deviation (volatility) of return of security i
FCF_t	free cash flow at date t	T	option expiration date, maturity date, market value of target
FV	future value, face value of a bond	U	market value of unlevered equity
g	growth rate	V_t	enterprise value on date t
I	initial investment or initial capital committed to the project	$Var(R)$	variance of return R
Int_t	interest expense on date t	x_i	portfolio weight of investment in i
IRR	internal rate of return	YTC	yield to call on a callable bond
K	strike price	YTM	yield to maturity
k	interest coverage ratio, compounding periods per year	α_i	alpha of security i
L	lease payment, market value of liabilities	β_D, β_E	beta of debt or equity
\ln	natural logarithm	β_i	beta of security i with respect to the market portfolio
MV_i	total market capitalization of security i	β_s^P	beta of security i with respect to portfolio P
N	number of cash flows, terminal date, notational principal of a swap contract	β_U	beta of unlevered firm
N_i	number of shares outstanding of security i	Δ	shares of stock in the replicating portfolio; sensitivity of option price to stock price
$NPER$	annuity spreadsheet notation for the number of periods or dates of the last cash flow	σ	volatility
NPV	net present value	τ	tax rate
P	price, initial principal or deposit, or equivalent present value, put option price	τ_c	marginal corporate tax rate

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JONATHAN BERK

STANFORD UNIVERSITY

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STANFORD UNIVERSITY



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To Kauai, Pono, Koa, and Kai, for all the love and laughter —P. D.

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Bridging Theory and Practice

GLOBAL FINANCIAL CRISIS

European Sovereign Debt Yields: A Puzzle

Before the EMU created the euro as a single European currency, the yields of sovereign debt issued by European countries varied widely. These variations primarily reflected differences in inflation expectations and currency risk (see Figure 6.6). However, after the monetary union was put in place at the end of 1998, the yields all essentially converged to the yield on German government bonds. Investors seemed to conclude that there was little distinction between the debt of the European countries in the union—they seemed to feel that all countries in the union were essentially exposed to the same default, inflation and currency risk and thus equally “safe.”

Presumably, investors believed that an outright default was unthinkable: They apparently believed that member

countries would be fiscally responsible and manage their debt obligations to avoid default at all costs. But as illustrated by Figure 6.6, once the 2008 financial crisis revealed the folly of this assumption, debt yields once again diverged as investors acknowledged the likelihood that some countries (particularly Portugal and Ireland) might be unable to repay their debt and would be forced to default.

In retrospect, rather than bringing fiscal responsibility, the monetary union allowed the weaker member countries to borrow at dramatically lower rates. In response, these countries reacted by increasing their borrowing—and at least in Greece’s case, borrowed to the point that default became inevitable.

Focus on the Financial Crisis and Sovereign Debt Crisis

— **Global Financial Crisis boxes** reflect the reality of the recent financial crisis and ongoing sovereign debt crisis, noting lessons learned. Twenty-two boxes across the book illustrate and analyze key details.

The Law of One Price as the Unifying Valuation Framework

The Law of One Price framework reflects the modern idea that the absence of arbitrage is the unifying concept of valuation. This critical insight is introduced in Chapter 3, revisited in each part opener, and integrated throughout the text—motivating all major concepts and connecting theory to practice.

Study Aids with a Practical Focus

To be successful, students need to master the core concepts and learn to identify and solve problems that today’s practitioners face.

— **Common Mistakes boxes** alert students to frequently made mistakes stemming from misunderstanding core concepts and calculations—in the classroom and in the field.

COMMON MISTAKE Discounting One Too Many Times

The perpetuity formula assumes that the first payment occurs at the end of the first period (at date 1). Sometimes perpetuities have cash flows that start later in the future. In this case, we can adapt the perpetuity formula to compute the present value, but we need to do so carefully to avoid a common mistake.

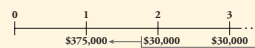
To illustrate, consider the MBA graduation party described in Example 4.7. Rather than starting immediately, suppose that the first party will be held two years from today (for the current entering class). How would this delay change the amount of the donation required?

Now the timeline looks like this:



We need to determine the present value of these cash flows, as it tells us the amount of money in the bank needed today to finance the future parties. We cannot apply the perpetuity formula directly, however, because these cash flows are not *exactly* a perpetuity as we defined it. Specifically, the cash flow in the first period is “missing.” But consider the situation on date 1—at that point, the first party is one period

away and then the cash flows are periodic. From the perspective of date 1, this is a perpetuity, and we can apply the formula. From the preceding calculation, we know we need \$375,000 on date 1 to have enough to start the parties on date 2. We rewrite the timeline as follows:



Our goal can now be restated more simply: How much do we need to invest today to have \$375,000 in one year? This is a simple present value calculation:

$$PV = \$375,000 / 1.08 = \$347,222 \text{ today}$$

A common mistake is to discount the \$375,000 twice because the first party is in two periods. Remember—the present value formula for the perpetuity already discounts the cash flows to one period prior to the first cash flow. Keep in mind that this common mistake may be made with perpetuities, annuities, and all of the other special cases discussed in this section. All of these formulas discount the cash flows to one period prior to the first cash flow.

Kevin M. Warsh, a lecturer at Stanford’s Graduate School of Business and a distinguished visiting fellow at the Hoover Institution, was a Federal Reserve governor from 2006 to 2011, serving as chief liaison to the financial markets.

QUESTION: What are the main policy instruments used by central banks to control the economy?

ANSWER: The Federal Reserve (Fed) deploys several policy tools to achieve its goals of price stability, maximum sustainable employment, and financial stability. Lowering the federal funds short-term interest rate, the primary policy instrument, stimulates the economy. Raising the federal funds rate generally slows the economy. Buying and selling short-term U.S. Treasury securities through open market operations is standard practice. Prior to the 2007–2009 financial crisis, the Fed’s balance sheet ranged from \$700–\$900 billion. But when the Fed was unable to lower interest rates further because rates were so close to zero already, it resorted to large-scale, longer-term open market operations to increase liquidity in the financial system in the hopes of stimulating the economy further, thus growing its balance sheet significantly. With open mouth operations, the Fed’s announcements of its intent to buy or sell assets indicates its desired degree of future policy accommodation, often prompting markets to react and move interest rates immediately. The Fed’s *Forward Guidance* is a tool used to communicate its future policy intentions.

INTERVIEW WITH KEVIN M. WARSH



clarity and confidence in the financial wherewithal of each other. One effective, innovative tool, the *Term Auction Facility (TAF)*, stimulated the economy by providing cheap and readily available term funding to banks, large and small, on the front lines of the economy, thus encouraging them to extend credit to businesses and consumers. After reducing the policy rate to near zero to help revive the economy, the Fed instituted two *Quantitative Easing (QE)* programs—special purchases of government and agency securities—to increase money supply, promote lending, and according to some proponents, increase prices of riskier assets.

The Fed also addressed the global liquidity crisis by establishing temporary *central bank liquidity swap lines* with the European Central Bank and other major central banks. Using this facility, a foreign central bank is able to obtain dollar funding for its customers by swapping Euros for another currency and agreeing to reverse the swap at a later date. The Fed does not take exchange rate risk, but it is subject to the credit risk of its financial system counterpart.

QUESTION: What tools is the European Central Bank (ECB) using to address the sovereign debt crisis? How does its approach compare to the Fed’s approach during the 2007–2009 crisis?

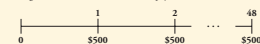
EXAMPLE 4.14 Evaluating an Annuity with Monthly Cash Flows

Problem

You are about to purchase a new car and have two options to pay for it. You can pay \$20,000 in cash immediately, or you can get a loan that requires you to pay \$500 each month for the next 48 months (four years). If the monthly interest rate you earn on your cash is 0.5%, which option should you take?

Solution

Let’s start by writing down the timeline of the loan payments:



The timeline shows that the loan is a 48-period annuity. Using the annuity formula the present value is

$$PV(48\text{-period annuity of } \$500) = \$500 \times \frac{1}{0.005} \left(1 - \frac{1}{1.005^{48}} \right) = \$21,290$$

Alternatively, we may use the annuity spreadsheet to solve the problem:

	NPER	RATE	PV	PMT	FV	Excel Formula
Given	48	0.50%		500	0	
Solve for PV			(\$21,290)			=PV(0.005, 48, 500, 0)

Thus, taking the loan is equivalent to paying \$21,290 today, which is costlier than paying cash. You should pay cash for the car.

Worked Examples accompany every important concept using a step-by-step procedure that guides students through the solution process. Clear labels make them easy to find for help with homework and studying.

Applications that Reflect Real Practice

Corporate Finance features actual companies and leaders in the field.

— **Interviews** with notable practitioners—six new for this edition—highlight leaders in the field and address the effects of the financial crisis.

General Interest boxes highlight timely material from financial publications that shed light on business problems and real-company practices.

Teaching Students to Think Finance

With a consistency in presentation and an innovative set of learning aids, *Corporate Finance* simultaneously meets the needs of both future financial managers and non-financial managers. This textbook truly shows every student how to “think finance.”

Simplified Presentation of Mathematics

One of the hardest parts of learning finance is mastering the jargon, math, and non-standardized notation. *Corporate Finance* systematically uses:

Notation Boxes: Each chapter opens by defining the variables and acronyms used in the chapter as a “legend” for students’ reference.

Timelines: Introduced in Chapter 4, timelines are emphasized as the important first step in solving *every* problem that involves cash flows.

Numbered and Labeled Equations: The first time a full equation is given in notation form it is numbered. Key equations are titled and revisited in the chapter summary.

Using Excel Boxes: Provide hands-on instruction of Excel techniques and include screenshots to serve as a guide for students.

Spreadsheet Tables: Select tables are available as Excel files, enabling students to change inputs and manipulate the underlying calculations.

USING EXCEL

Excel's IRR Function

Excel also has a built-in function, IRR, that will calculate the IRR of a stream of cash flows. Excel's IRR function has the format, IRR (values, guess), where “values” is the range containing the cash flows, and “guess” is an optional starting guess where Excel begins its search for an IRR. See the example below:

	A	B	C	D	E
1 Period	0	1	2	3	
2 Cash Flow C_t	(1,000.0)	300.0	400.0	500.0	
3 IRR		8.9% =IRR(B2:E2)			

There are three things to note about the IRR function. First, the values given to the IRR function should include all of the cash flows of the project, including the one at date 0. In this sense, the IRR and NPV functions in Excel are inconsistent. Second, like the NPV function, the IRR ignores the period associated with any blank cells. Finally, as we will discuss in Chapter 7, in some settings the IRR function may fail to find a solution, or may give a different answer, depending on the initial guess.

TABLE 8.1
SPREADSHEET

HomeNet's Incremental Earnings Forecast

	Year	0	1	2	3	4	5
Incremental Earnings Forecast (\$000s)							
1 Sales	—	26,000	26,000	26,000	26,000	—	—
2 Cost of Goods Sold	—	(11,000)	(11,000)	(11,000)	(11,000)	—	—
3 Gross Profit	—	15,000	15,000	15,000	15,000	—	—
4 Selling, General, and Administrative	—	(2,800)	(2,800)	(2,800)	(2,800)	—	—
5 Research and Development	(15,000)	—	—	—	—	—	—
6 Depreciation	—	(1,500)	(1,500)	(1,500)	(1,500)	(1,500)	(1,500)
7 EBIT	(15,000)	10,700	10,700	10,700	10,700	10,700	(1,500)
8 Income Tax at 40%	6,000	(4,280)	(4,280)	(4,280)	(4,280)	600	—
9 Unlevered Net Income	(9,000)	6,420	6,420	6,420	6,420	900	—

Practice Finance to Learn Finance

Working problems is the proven way to cement and demonstrate an understanding of finance.

Concept Check questions at the end of each section enable students to test their understanding and target areas in which they need further review.

End-of-chapter problems written personally by Jonathan Berk and Peter DeMarzo offer instructors the opportunity to assign first-rate materials to students for homework and practice with the confidence that the problems are consistent with chapter content. Both the problems and solutions, which also were written by the authors, have been class-tested and accuracy-checked to ensure quality.

Data Cases present in-depth scenarios in a business setting with questions designed to guide students’ analysis. Many questions involve the use of Internet resources and Excel techniques.

Data Case

This is your second interview with a prestigious brokerage firm for a job as an equity analyst. You survived the morning interviews with the department manager and the Vice President of Equity. Everything has gone so well that they want to test your ability as an analyst. You are seated in a room with a computer and a list with the names of two companies—Ford (F) and Microsoft (MSFT). You have 90 minutes to complete the following tasks:

- Download the annual income statements, balance sheets, and cash flow statements for the last four fiscal years from MarketWatch (www.marketwatch.com). Enter each company's stock symbol and then go to “financials.” Export the statements to Excel by clicking the export button.
- Find historical stock prices for each firm from Yahoo! Finance (finance.yahoo.com). Enter your stock symbol, click “Historical Prices” in the left column, and enter the proper date range to cover the last day of the month corresponding to the date of each financial statement. Use the closing stock prices (not the adjusted close). To calculate the firm's market capitalization at each date, multiply the number of shares outstanding (see “Basic” on the income statement under “Weighted Average Shares Outstanding”) by the firm's historic stock price.
- For each of the four years of statements, compute the following ratios for each firm:

Valuation Ratios

Price-Earnings Ratio (for EPS use Diluted EPS Total)

Market-to-Book Ratio

Enterprise Value-to-EBITDA

(For debt, include long-term and short-term debt; for cash, include marketable securities.)

Profitability Ratios

Operating Margin

Net Profit Margin

MyFinanceLab

Because practice with homework problems is crucial to learning finance, *Corporate Finance* is available with MyFinanceLab, a fully integrated homework and tutorial system. MyFinanceLab revolutionizes homework and practice with material written and developed by Jonathan Berk and Peter DeMarzo.

Online Assessment Using End-of-Chapter Problems

The seamless integration among the textbook, assessment materials, and online resources sets a new standard in corporate finance education.

Chapter 4: The Time Value of Money

Problem 4-14 (similar)

You have been offered a unique investment opportunity. If you invest \$25,000 today, you will receive \$1,250 one year from now, \$3,750 two years from now, and \$25,000 ten years from now.

a. What is the NPV of the investment opportunity if the interest rate is 10% per year? Should you take the opportunity?

b. What is the NPV of the investment opportunity if the interest rate is 5% per year? Should you take the opportunity?

Here are the cash flows:

Year	0	1	2	...	10
Cash Flow	-\$25,000	\$1,250	\$3,750	...	\$25,000

The formula to find the net present value of this stream of cash flows is as follows:

Press Continue to see more.

14. You have been offered a unique investment opportunity. If you invest \$10,000 today, you will receive \$500 one year from now, \$1,500 two years from now, and \$10,000 ten years from now.

a. What is the NPV of the opportunity if the interest rate is 6% per year? Should you take the opportunity?

b. What is the NPV of the opportunity if the interest rate is 2% per year? Should you take it now?

Homework: Time Value of Money Homework 1

Score: 0 of 1 pt

Problem 4-14 (similar)

You have been offered a unique investment opportunity. If you invest \$25,000 today, you will receive \$1,250 one year from now, \$3,750 two years from now, and \$25,000 ten years from now.

a. What is the NPV of the investment opportunity if the interest rate is 10% per year? Should you take the opportunity?

b. What is the NPV of the investment opportunity if the interest rate is 5% per year? Should you take the opportunity?

Here are the cash flows:

Year	0	1	2	...	10
Cash Flow	-\$25,000	\$1,250	\$3,750	...	\$25,000

The formula to find the net present value of this stream of cash flows is as follows:

Press Continue to see more.

Enter your answer:

3 parts remaining

Continue

Check Answer

- **End-of-chapter problems**—every single one—appear online. The values in the problems are algorithmically generated, giving students many opportunities for practice and mastery. Problems can be assigned by professors and completed online by students.
- **Helpful tutorial tools**, along with the same pedagogical aids from the text, support students as they study. Links to the eText direct students right to the material they most need to review.
- **Interactive Figures**—Select in-text graphs and figures—covering topics such as bonds, stock valuation, NPV, and IRR—have been digitally enhanced to allow students to interact with variables to affect outcomes and bring concepts to life.

Additional Resources in MyFinanceLab

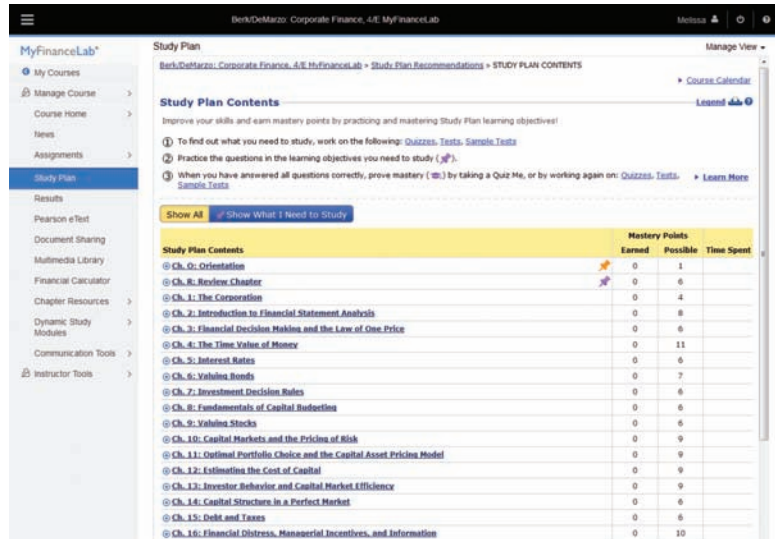
- **Video clips** profile high-profile firms such as Boeing, Cisco, Delta, and Intel through interviews and analysis. The videos focus on core topical areas, including capital budgeting, mergers and acquisitions, and risk and return.
- **Auto-Graded Excel Projects**—Using proven, field-tested technology, MyFinanceLab's new auto-graded Excel Projects allow instructors to seamlessly integrate Excel content into their course.
- **Finance in the News** provides weekly postings of a relevant and current article from a newspaper or journal article with discussion questions that are assignable in MyFinanceLab.
- **Live news and video feeds** from *The Financial Times* and ABC News provide real-time news updates.
- **Author Solution Videos** walk through the in-text examples using math, the financial calculator, and spreadsheets.

To learn more about MyFinanceLab, visit www.myfinancelab.com.

Hands-On Practice, Hands-Off Grading

Hands-On, Targeted Practice

Students can take pre-built Practice Tests for each chapter, and their test results will generate an individualized Study Plan. With the Study Plan, students learn to focus their energies on the topics they need to be successful in class, on exams, and, ultimately, in their careers.



Study Plan Contents		Mastery Points	
		Earned	Possible
Ch. 0: Orientation		0	1
Ch. 1: Review Chapter		0	6
Ch. 1: The Corporation		0	4
Ch. 2: Introduction to Financial Statement Analysis		0	8
Ch. 3: Financial Decision Making and the Law of One Price		0	6
Ch. 4: The Time Value of Money		0	11
Ch. 5: Interest Rates		0	6
Ch. 6: Valuing Bonds		0	7
Ch. 7: Investment Decision Rules		0	6
Ch. 8: Fundamentals of Capital Budgeting		0	6
Ch. 9: Valuing Stocks		0	6
Ch. 10: Capital Markets and the Pricing of Risk		0	9
Ch. 11: Optimal Portfolio Choice and the Capital Asset Pricing Model		0	9
Ch. 12: Estimating the Cost of Capital		0	9
Ch. 13: Investor Behavior and Capital Market Efficiency		0	9
Ch. 14: Capital Structures in a Perfect Market		0	6
Ch. 15: Debt and Taxes		0	6
Ch. 16: Financial Distress, Managerial Incentives, and Information		0	10

Powerful Instructor Tools

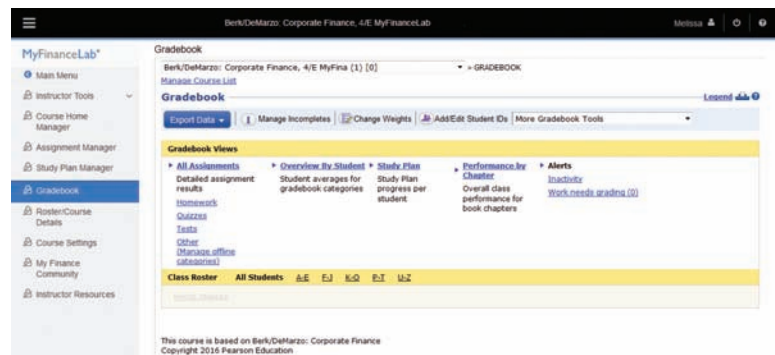
MyFinanceLab provides flexible tools that enable instructors to easily customize the online course materials to suit their needs.

■ Easy-to-Use Homework Manager.

Instructors can easily create and assign tests, quizzes, or graded homework assignments. In addition to pre-built MyFinanceLab questions, the Test Bank is also available so that instructors have ample material with which to create assignments.

■ Flexible Gradebook. MyFinanceLab saves time by automatically grading students' work and tracking results in an online Gradebook.

■ Downloadable Classroom Resources. Instructors also have access to online versions of each instructor supplement, including the Instructor's Manual, Solutions Manual, PowerPoint Lecture Notes, and Test Bank.



Gradebook Views	
All Assignments	Overview by Student
Detailed assignment results	Student averages for gradebook categories
Homeworks	Study Plan progress per student
Quizzes	Performance by Chapter
Tests	Overall class performance for book chapters
Other (Manuals, offline assignments)	Alerts

Class Roster: All Students, A-E, F-J, K-Q, R-T, U-Z

To learn more about MyFinanceLab, visit www.myfinancelab.com.

About the Authors

Jonathan Berk is the A.P. Giannini Professor of Finance at the Graduate School of Business, Stanford University and is a Research Associate at the National Bureau of Economic Research. Before coming to Stanford, he was the Sylvan Coleman Professor of Finance at Haas School of Business at the University of California, Berkeley. Prior to earning his Ph.D., he worked as an Associate at Goldman Sachs (where his education in finance really began).

Professor Berk's research interests in finance include corporate valuation, capital structure, mutual funds, asset pricing, experimental economics, and labor economics. His work has won a number of research awards including the TIAA-CREF Paul A. Samuelson Award, the Smith Breeden Prize, Best Paper of the Year in *The Review of Financial Studies*, and the FAME Research Prize. His paper, "A Critique of Size-Related Anomalies," was selected as one of the two best papers ever published in *The Review of Financial Studies*. In recognition of his influence on the practice of finance he has received the Bernstein-Fabozzi/Jacobs Levy Award, the Graham and Dodd Award of Excellence, and the Roger F. Murray Prize. He

served two terms as an Associate Editor of the *Journal of Finance*, and a term as a director of the American Finance Association, the Western Finance Association, and academic director of the Financial Management Association. He is a Fellow of the Financial Management Association and a member of the advisory board of the *Journal of Portfolio Management*.

Born in Johannesburg, South Africa, Professor Berk is married, with two daughters, and is an avid skier and biker.



Peter DeMarzo and Jonathan Berk

Peter DeMarzo is the Mizuho Financial Group Professor of Finance at the Graduate School of Business, Stanford University. He is the current Vice President of the American Finance Association and a Research Associate at the National Bureau of Economic Research. He teaches MBA and Ph.D. courses in Corporate

Finance and Financial Modeling. In addition to his experience at the Stanford Graduate School of Business, Professor DeMarzo has taught at the Haas School of Business and the Kellogg Graduate School of Management, and he was a National Fellow at the Hoover Institution.

Professor DeMarzo received the Sloan Teaching Excellence Award at Stanford and the Earl F. Cheit Outstanding Teaching Award at U.C. Berkeley. Professor DeMarzo has served as an Associate Editor for *The Review of Financial Studies*, *Financial Management*, and the *B.E. Journals in Economic Analysis and Policy*, as well as a director of the American Finance Association. He has served as Vice President and President of the Western Finance Association. Professor DeMarzo's research is in the area of corporate finance, asset securitization, and contracting, as well as market structure and regulation. His recent work has examined issues of the optimal design of contracts and securities, leverage dynamics and the role of bank capital regulation, and the influence of information asymmetries on stock prices and corporate investment. He has received numerous awards including the Western Finance Association Corporate Finance Award and the Barclays Global Investors/Michael Brennan best-paper award from *The Review of Financial Studies*.

Professor DeMarzo was born in Whitestone, New York, and is married with three boys. He and his family enjoy hiking, biking, and skiing.

Preface

WE WERE MOTIVATED TO WRITE THIS TEXTBOOK BY A CENTRAL insight: The core concepts in finance are simple and intuitive. What makes the subject challenging is that it is often difficult for a novice to distinguish between these core ideas and other intuitively appealing approaches that, if used in financial decision making, will lead to incorrect decisions. De-emphasizing the core concepts that underlie finance strips students of the essential intellectual tools they need to differentiate between good and bad decision making.

We present corporate finance as an application of a set of simple, powerful ideas. At the heart is the principal of the absence of arbitrage opportunities, or Law of One Price—*in life, you don't get something for nothing*. This simple concept is a powerful and important tool in financial decision making. By relying on it, and the other core principles in this book, financial decision makers can avoid the bad decisions brought to light by the recent financial crisis. We use the Law of One Price as a compass; it keeps financial decision makers on the right track and is the backbone of the entire book.

New to This Edition

We have updated all text discussions and figures, tables, data cases, and facts to accurately reflect developments in the field in the last four years. Specific highlights include the following:

- Increased coverage of early stage financing in Chapter 23 (Raising Equity Capital), including a detailed explanation of angel financing, venture capital deal terms, and an expanded explanation of typical returns investors might earn.
- Addressed the implications of negative interest rates throughout the book.
- Expanded coverage of the European debt crisis in Chapter 6 (Valuing Bonds) including a case study on the Greek default.
- Added material throughout Part 5 (Capital Structure) that relates the capital structure to the current debate on bank leverage.
- Added coverage in Chapter 1 (The Corporation) describing the ongoing changes to how stocks are traded worldwide.
- Expanded the explanation of key financial ratios in Chapter 2 (Introduction to Financial Statement Analysis) and index arbitrage in Chapter 3 (Financial Decision Making and the Law of One Price).
- Redesigned sections of Chapter 22 (Real Options) with new examples to make the exposition clearer.
- Updated the coverage in Chapter 13 (Investor Behavior and Capital Market Efficiency) to reflect recent developments in asset pricing.
- Six new practitioner interviews incorporate timely perspectives from leaders in the field related to the recent financial crisis and ongoing European sovereign debt crisis.
- Added Nobel Prize boxes to reflect the recent Nobel Prizes awarded for material covered in the book.
- Added a new Case Study, two new Data Cases, new problems and refined many others, once again personally writing and solving each one. In addition, every single problem is available in [MyFinanceLab](#), the groundbreaking homework and tutorial system that accompanies the book.

The Law of One Price as a Unifying Principle of Valuation

This book presents corporate finance as an application of a small set of simple core ideas. Modern finance theory and practice is grounded in the idea of the absence of arbitrage—or the Law of One Price—as the unifying concept in valuation. We introduce the Law of One Price concept as the basis for NPV and the time value of money in Chapter 3, *Financial Decision Making and the Law of One Price*. In the opening of each part and as pertinent throughout the remaining chapters, we relate major concepts to the Law of One Price, creating a framework to ground the student reader and connect theory to practice.

Table of Contents Overview

Corporate Finance offers coverage of the major topical areas for introductory-level MBA students as well as the depth required in a reference textbook for upper-division courses. Most professors customize their classes by selecting a subset of chapters reflecting the subject matter they consider most important. We designed this book from the outset with this need for flexibility in mind. Parts 2 through 6 are the core chapters in the book. We envision that most MBA programs will cover this material—yet even within these core chapters instructors can pick and choose.

Single quarter course: Cover Chapters 3–15; if time allows, or students are previously familiar with the time value of money, add on Chapters 16–19.

Semester-long course: Incorporate options (Chapters 20–22) and Part 10, *Special Topics*, chapters as desired.

Single mini-semester: Assign Chapters 3–10, 14, and 15 if time allows.

Chapter	Highlights and Changes
1 The Corporation	Introduces the corporation and its governance; updated the Dodd-Frank Act information; new interview with M. Hatheway, NASDAQ
2 Introduction to Financial Statement Analysis	Introduces key financial statements; coverage of financial ratios is centralized to prepare students to analyze financial statements holistically; new interview with Ruth Porat, Google
3 Financial Decision Making and the Law of One Price	Introduces the Law of One Price and net present value as the basis of the book's unifying framework; new box on dynamics of stock index arbitrage and high-frequency trading
4 The Time Value of Money	Introduces the mechanics of discounting with applications to personal finance; Using Excel boxes familiarizes students with spreadsheet functionality; new box on an annuity due
5 Interest Rates	Discusses key determinants of interest rates and their relation to the cost of capital; new Data Case on Florida's pension plan liability
6 Valuing Bonds	Analyzes bond prices and yields, as well as the risk of fixed-income securities as illustrated by the sovereign debt crisis; expanded Global Financial Crisis box on negative bond yields; new Case Study on Greek default
7 Investment Decision Rules	Introduces the NPV rule as the “golden rule” against which we evaluate other investment decision rules; new Data Case using NPV rule to choose between mortgage loans; introduces the use of Data Tables for sensitivity analysis
8 Fundamentals of Capital Budgeting	Provides a clear focus on the distinction between earnings and free cash flow, and shows how to build a financial model to assess the NPV of an investment decision; new Common Mistake box on the sunk cost fallacy

Chapter	Highlights and Changes
9 Valuing Stocks	Provides a unifying treatment of projects within the firm and the valuation of the firm as a whole
10 Capital Markets and the Pricing of Risk	Establishes the intuition for understanding risk and return, explains the distinction between diversifiable and systematic risk, and introduces beta and the CAPM; extensive data updates throughout to reflect current market conditions
11 Optimal Portfolio Choice and the Capital Asset Pricing Model	Presents the CAPM and develops the details of mean-variance portfolio optimization; updated examples and Data Case
12 Estimating the Cost of Capital	Demonstrates the practical details of estimating the cost of capital for equity, debt, or a project, and introduces asset betas, and the unlevered and weighted-average cost of capital; new Common Mistake box on using a single cost of capital in multi-divisional firms; new Using Excel box on estimating beta
13 Investor Behavior and Capital Market Efficiency	Examines the role of behavioral finance and ties investor behavior to the topic of market efficiency and alternative models of risk and return; expanded discussion of fund manager performance; updated interview with Jonathan Clements, former columnist at <i>WSJ</i>
14 Capital Structure in a Perfect Market	Presents Modigliani and Miller's results and introduces the market value balance sheet, discussion of important leverage fallacies with application to bank capital regulation
15 Debt and Taxes	Analyzes the tax benefits of leverage, including the debt tax shield and the after-tax WACC; new box on the repatriation tax controversy
16 Financial Distress, Managerial Incentives, and Information	Examines the role of asymmetric information and introduces the debt overhang and leverage ratchet effect
17 Payout Policy	Considers alternative payout policies including dividends and share repurchases; analyzes the role of market imperfections in determining the firm's payout policy; updated discussion of corporate cash retention
18 Capital Budgeting and Valuation with Leverage	Develops in depth the three main methods for capital budgeting with leverage and market imperfections: the weighted average cost of capital (WACC) method, the adjusted present value (APV) method, and the flow-to-equity (FTE) method; new interview with Zane Rowe, VMware; new appendix explaining the relation between DCF and residual income valuation methods
19 Valuation and Financial Modeling: A Case Study	Builds a financial model for a leveraged acquisition; new Using Excel box "Summarizing Model Outputs"
20 Financial Options	Introduces the concept of financial options, how they are used and exercised; demonstrates how corporate securities may be interpreted using options
21 Option Valuation	Develops the binomial, Black-Scholes, and risk-neutral pricing methods for option pricing
22 Real Options	Analyzes real options using decision tree and Black-Scholes methods, and considers the optimal staging of investment; expanded discussion of decision tree methodology with new examples
23 Raising Equity Capital	Overview of the stages of equity financing, from angel financing and venture capital to IPO to seasoned equity offerings; new expanded coverage of venture capital financing including common deal terms and protections as well as an illustration of typical funding patterns and success rates; new Common Mistake box on misinterpreting start-up valuations; new interview with Kevin Laws, AngelList

Chapter	Highlights and Changes
24 Debt Financing	Overview of debt financing, including a discussion of asset-backed securities and their role in the financial crisis; new box on Detroit's municipal bond default
25 Leasing	Introduces leasing as an alternative form of levered financing; update on new FASB rules for lease accounting; new interview with Mark S. Long, XOJet
26 Working Capital Management	Introduces the Cash Conversion Cycle and methods for managing working capital
27 Short-Term Financial Planning	Develops methods for forecasting and managing short-term cash needs; new box on the Ex-Im Bank controversy
28 Mergers and Acquisitions	Considers motives and methods for mergers and acquisitions, including leveraged buyouts; expanded discussion of valuation and premiums paid
29 Corporate Governance	Evaluates direct monitoring, compensation policies, and regulation as methods to manage agency conflicts within the firm; addresses impact of Dodd-Frank Act; new discussion of shareholder activism and its recent impact on corporate governance
30 Risk Management	Analyzes the methods and motives for the use of insurance, commodity futures, currency forwards and options, and interest rate swaps to hedge risk
31 International Corporate Finance	Analyzes the valuation of projects with foreign currency cash flows with integrated or segregated capital markets

A Complete Instructor and Student Support Package

MyFinanceLab

A critical component of the text, [MyFinanceLab](#) will give all students the practice and tutorial help they need to succeed. For more details, see pages 21–22.

Instructor's Resource Center

The 'Instructor resources' link, accessible at www.pearsonglobaleditions.com/berk, hosts all of the instructor resources that follow. Instructors should click on the "IRC Help Center" link for easy-to-follow instructions on getting access or may contact their sales representative for further information.

Solutions Manual

- Prepared by Jonathan Berk and Peter DeMarzo.
- Provides detailed, accuracy-verified, class-tested solutions to every chapter Problem.
- See the Instructor's Resource Center for spreadsheet solutions to select chapter Problems and Data Cases.

Instructor's Manual

- Written by Janet Payne of Texas State University.
- Corresponding to each chapter, provides: chapter overview and outline correlated to the PowerPoint Lecture Notes; learning objectives; guide to fresh worked examples in the PowerPoint Lecture Notes; and listing of chapter problems with accompanying Excel spreadsheets.

Test Item File

- Revised by Janet Payne and William Chittenden of Texas State University.
- Provides a wide selection of multiple-choice, short answer, and essay questions qualified by difficulty level and skill type and correlated to chapter topics. Numerical-based Problems include step-by-step solutions.
- Available as Computerized Test Bank in TestGen.

PowerPoint Lecture Presentation

- Authored by William Chittenden of Texas State University.
- Offers outlines of each chapter with graphs, tables, key terms, and concepts from each chapter.
- Worked examples provide detailed, step-by-step solutions in the same format as the boxes from the text and correlated to parallel specific textbook examples.

Videos

- Profile well-known firms such as Boeing and Intel through interview and analysis.
- Focus on core topical areas such as capital budgeting and risk and return.
- Author Solution Videos that walk through the in-text examples using math, the financial calculator, and spreadsheets.
- Available in [MyFinanceLab](#).

Acknowledgments

Looking back, it is hard to believe that this book is in its fourth edition. We are heartened by its success and impact on the profession through shaping future practitioners. As any textbook writer will tell you, achieving this level of success requires a substantial amount of help. First and foremost we thank Donna Battista, whose leadership, talent, and market savvy are imprinted on all aspects of the project and are central to its more than 10 years of success; Denise Clinton, a friend and a leader in fact not just in name, whose experience and knowledge were indispensable in the earliest stages; Rebecca Ferris-Caruso, for her unparalleled expertise in managing the complex writing, reviewing, and editing processes and patience in keeping us on track—it is impossible to imagine writing the first edition without her; Jami Minard, for spearheading marketing efforts; Kate Fernandes, for her energy and fresh perspective as our new editor; Miguel Leonarte, for his central role on MyFinanceLab; Gillian Hall for getting the book from draft pages into print; and Paul Corey for his insightful leadership and unwavering support of this fourth edition. We were blessed to be approached by the best publisher in the business and we are both truly thankful for the indispensable help provided by these and other professionals, including Kathryn Brightney, Dottie Dennis, Meredith Gertz, Nancy Freihofer, Melissa Honig, and Carol Melville.

Updating a textbook like ours requires a lot of painstaking work, and there are many who have provided insights and input along the way. We would especially like to call out Jared Stanfield for his important contributions and suggestions throughout. We're also appreciative of Marlene Bellamy's work conducting the lively interviews that provide a critically important perspective, and to the interviewees who graciously provided their time and insights.

Of course, this fourth edition text is built upon the shoulders of the first three, and we have many to thank for helping us make those early versions a reality. We remain forever grateful for Jennifer Koski's critical insights, belief in this project, and tireless effort, all of which were

critical to the first edition. Many of the later, non-core chapters required specific detailed knowledge. Nigel Barradale, Reid Click, Jarrad Harford, and Marianne Plunkert ensured that this knowledge was effectively communicated. Joseph Vu and Vance P. Lesseig contributed their talents to the Concept Check questions and Data Cases, respectively.

Creating a truly error-free text is a challenge we could not have lived up to without our team of expert error checkers; we owe particular thanks to Sukarnen Suwanto, Siddharth Bellur, Robert James, Anand Goel, Ian Drummond Gow, Janet Payne, and Jared Stanfield. Thomas Gilbert and Miguel Palacios tirelessly worked examples and problems in the first edition, while providing numerous insights along the way.

A corporate finance textbook is the product of the talents and hard work of many talented colleagues. We are especially gratified with the work of those who updated the impressive array of supplements to accompany the book: Janet Payne and William Chittenden, for the Instructor's Manual, Test Item File, and PowerPoint; and Sukarnen Suwanto, for his accuracy review of the Solutions Manual.

As a colleague of both of us, Mark Rubinstein inspired us with his passion to get the history of finance right by correctly attributing the important ideas to the people who first enunciated them. We have used his book, *A History of the Theory of Investments: My Annotated Bibliography*, extensively in this text and we, as well as the profession as a whole, owe him a debt of gratitude for taking the time to write it all down.

We could not have written this text if we were not once ourselves students of finance. As any student knows, the key to success is having a great teacher. In our case we are lucky to have been taught and advised by the people who helped create modern finance: Ken Arrow, Darrell Duffie, Mordecai Kurz, Stephen Ross, and Richard Roll. It was from them that we learned the importance of the core principles of finance, including the Law of One Price, on which this book is based. The learning process does not end at graduation and like most people we have had especially influential colleagues and mentors from which we learned a great deal during our careers and we would like to recognize them explicitly here: Mike Fishman, Richard Green, Vasant Naik, Art Raviv, Mark Rubinstein, Joe Williams, and Jeff Zwiebel. The passing of Rick last year was a loss we will feel forever. We continue to learn from all of our colleagues and we are grateful to all of them. Finally, we would like to thank those with whom we have taught finance classes over the years: Anat Admati, Ming Huang, Dirk Jenter, Robert Korajczyk, Paul Pfleiderer, Sergio Rebelo, Richard Stanton, and Raman Uppal. Their ideas and teaching strategies have without a doubt influenced our own sense of pedagogy and found their way into this text.

Finally, and most importantly, we owe our biggest debt of gratitude to our spouses, Rebecca Schwartz and Kauai Chun DeMarzo. Little did we (or they) know how much this project would impact our lives, and without their continued love and support—and especially their patience and understanding—this text could not have been completed. We owe a special thanks to Kauai DeMarzo, for her inspiration and support at the start of this project, and for her willingness to be our in-house editor, contributor, advisor, and overall sounding-board throughout each stage of its development.

Jonathan Berk
Peter DeMarzo

Contributors

We are truly thankful to have had so many manuscript reviewers, class testers, and focus group participants. We list all of these contributors below, but Gordon Bodnar, James Conover, Anand Goel, James Linck, Evgeny Lyandres, Marianne Plunkert, Mark Simonson, and Andy Terry went so far beyond the call of duty that we would like to single them out.

We are very grateful for all comments—both informal and in written evaluations—from Third Edition users. We carefully weighed each reviewer suggestion as we sought to streamline the narrative to improve clarity and add relevant new material. The book has benefited enormously for this input.

Reviewers

- Ashok B. Abbott, *West Virginia University*
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Introduction

WHY STUDY CORPORATE FINANCE? No matter what your role in a corporation, an understanding of why and how financial decisions are made is essential. The focus of this book is how to make optimal corporate financial decisions. In this part of the book, we lay the foundation for our study of corporate finance. We begin, in Chapter 1, by introducing the corporation and related business forms. We then examine the role of financial managers and outside investors in decision making for the firm. To make optimal decisions, a decision maker needs information. As a result, in Chapter 2, we review an important source of information for corporate decision-making—the firm's financial statements.

We then introduce the most important idea in this book, the concept of *the absence of arbitrage* or *Law of One Price* in Chapter 3. The Law of One Price allows us to use market prices to determine the value of an investment opportunity to the firm. We will demonstrate that the Law of One Price is the one unifying principle that underlies all of financial economics and links all of the ideas throughout this book. We will return to this theme throughout our study of Corporate Finance.

CHAPTER 1 The Corporation

CHAPTER 2 Introduction to Financial Statement Analysis

CHAPTER 3 Financial Decision Making and the Law of One Price

The Corporation

THE MODERN U.S. CORPORATION WAS BORN IN A COURTROOM

in Washington, D.C., on February 2, 1819. On that day the U.S. Supreme Court established the legal precedent that the property of a corporation, like that of a person, is private and entitled to protection under the U.S. Constitution. Today, it is hard to entertain the possibility that a corporation's private property would not be protected under the Constitution. However, before the 1819 Supreme Court decision, the owners of a corporation were exposed to the possibility that the state could take their business. This concern was real enough to stop most businesses from incorporating and, indeed, in 1816 that concern was realized: The state seized Dartmouth College.

Dartmouth College was incorporated in 1769 as a private educational institution governed by a self-perpetuating board of trustees. Unhappy with the political leanings of the board, the state legislature effectively took control of Dartmouth by passing legislation in 1816 that established a governor-appointed board of overseers to run the school. The legislation had the effect of turning a private university under private control into a state university under state control. If such an act were constitutional, it implied that any state (or the federal government) could, at will, nationalize any corporation.

Dartmouth sued for its independence and the case made it to the Supreme Court under Chief Justice John Marshall in 1818. In a nearly unanimous 5–1 decision, the court struck down the New Hampshire law, ruling that a corporation was a “contract” and that, under Article 1 of the Constitution, “the state legislatures were forbidden to pass any law impairing the obligation of contracts.”¹ The precedent was set: Owners of businesses could incorporate and still enjoy the protection of private property, as well as protection from seizure, both guaranteed by the U.S. Constitution. The modern business corporation was born.

¹The full text of John Marshall's decision can be found at www.constitution.org/dwebster/dartmouth_decision.htm.

Today, the corporate structure is ubiquitous all over the world, and yet continues to evolve in the face of new forces. In 2008 the financial crisis once again transformed the financial landscape, bringing down giants like Bear Stearns, Lehman Brothers, and AIG and reshaping investment banks like Goldman Sachs into government-guaranteed commercial banks. Government bailouts have provoked challenging questions regarding the role of the federal government in the control and management of private corporations. In the wake of the crisis, significant reforms of the regulation and oversight of financial markets were passed into law. Understanding the principles of corporate finance has never been more important to the practice of business than it is now, during this time of great change.

The focus of this book is on how people in corporations make financial decisions. This chapter introduces the corporation and explains alternative business organizational forms. A key factor in the success of corporations is the ability to easily trade ownership shares, and so we will also explain the role of stock markets in facilitating trading among investors in a corporation and the implications that has for the ownership and control of corporations.

1.1 The Four Types of Firms

We begin our study of corporate finance by introducing the four major types of firms: *sole proprietorships*, *partnerships*, *limited liability companies*, and *corporations*. We explain each organizational form in turn, but our primary focus is on the most important form—the corporation. In addition to describing what a corporation is, we also provide an overview of why corporations are so successful.

Sole Proprietorships

A **sole proprietorship** is a business owned and run by one person. Sole proprietorships are usually very small with few, if any, employees. Although they do not account for much sales revenue in the economy, they are the most common type of firm in the world, as shown in Figure 1.1. Statistics indicate that nearly 72% of businesses in the United States are sole proprietorships, although they generate only 4% of the revenue.² Contrast this with corporations, which make up under 18% of firms but are responsible for 83% of U.S. revenue.

Sole proprietorships share the following key characteristics:

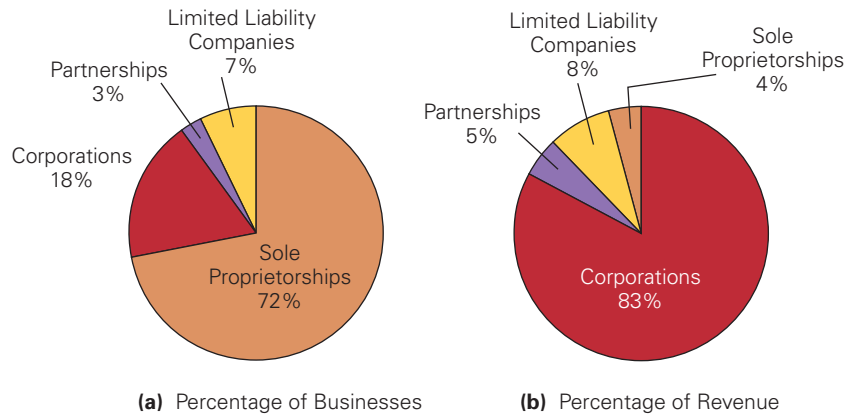
1. Sole proprietorships are straightforward to set up. Consequently, many new businesses use this organizational form.
2. The principal limitation of a sole proprietorship is that there is no separation between the firm and the owner—the firm can have only one owner. If there are other investors, they cannot hold an ownership stake in the firm.
3. The owner has unlimited personal liability for any of the firm's debts. That is, if the firm defaults on any debt payment, the lender can (and will) require the owner to repay the loan from personal assets. An owner who cannot afford to repay the loan must declare personal bankruptcy.

²www.irs.gov (www.irs.gov/uac/SOI-Tax-Stats-Integrated-Business-Data)

FIGURE 1.1**Types of U.S. Firms**

There are four different types of firms in the United States. As (a) and (b) show, although the majority of U.S. firms are sole proprietorships, they generate only a small fraction of total revenue, in contrast to corporations.

Source: www.irs.gov



4. The life of a sole proprietorship is limited to the life of the owner. It is also difficult to transfer ownership of a sole proprietorship.

For most businesses, the disadvantages of a sole proprietorship outweigh the advantages. As soon as the firm reaches the point at which it can borrow without the owner agreeing to be personally liable, the owners typically convert the business into a form that limits the owner's liability.

Partnerships

A **partnership** is identical to a sole proprietorship except it has more than one owner. The following are key features of a partnership:

1. *All* partners are liable for the firm's debt. That is, a lender can require *any* partner to repay all the firm's outstanding debts.
2. The partnership ends on the death or withdrawal of any single partner, although partners can avoid liquidation if the partnership agreement provides for alternatives such as a buyout of a deceased or withdrawn partner.

Some old and established businesses remain partnerships or sole proprietorships. Often these firms are the types of businesses in which the owners' personal reputations are the basis for the businesses. For example, law firms, groups of doctors, and accounting firms are often organized as partnerships. For such enterprises, the partners' personal liability increases the confidence of the firm's clients that the partners will strive to maintain their reputation.

A **limited partnership** is a partnership with two kinds of owners, general partners and limited partners. General partners have the same rights and privileges as partners in a (general) partnership—they are personally liable for the firm's debt obligations. Limited partners, however, have **limited liability**—that is, their liability is limited to their investment. Their private property cannot be seized to pay off the firm's outstanding debts. Furthermore, the death or withdrawal of a limited partner does not dissolve the partnership, and a limited partner's interest is transferable. However, a limited partner has no management authority and cannot legally be involved in the managerial decision making for the business.

Private equity funds and venture capital funds are two examples of industries dominated by limited partnerships. In these firms, a few general partners contribute some of their own capital and raise additional capital from outside investors who are limited partners. The general partners control how all the capital is invested. Most often they will actively participate in running the businesses they choose to invest in. The outside investors play no active role in the partnership other than monitoring how their investments are performing.

Limited Liability Companies

A **limited liability company (LLC)** is a limited partnership without a general partner. That is, all the owners have limited liability, but unlike limited partners, they can also run the business.

The LLC is a relatively new phenomenon in the United States. The first state to pass a statute allowing the creation of an LLC was Wyoming in 1977; the last was Hawaii in 1997. Internationally, companies with limited liability are much older and established. LLCs rose to prominence first in Germany over 100 years ago as a *Gesellschaft mit beschränkter Haftung* (GmbH) and then in other European and Latin American countries. An LLC is known in France as a *Société à responsabilité limitée* (SARL), and by similar names in Italy (SRL) and Spain (SL).

Corporations

The distinguishing feature of a **corporation** is that it is a legally defined, artificial being (a judicial person or legal entity), separate from its owners. As such, it has many of the legal powers that people have. It can enter into contracts, acquire assets, incur obligations, and, as we have already established, it enjoys protection under the U.S. Constitution against the seizure of its property. Because a corporation is a legal entity separate and distinct from its owners, it is solely responsible for its own obligations. Consequently, the owners of a corporation (or its employees, customers, etc.) are not liable for any obligations the corporation enters into. Similarly, the corporation is not liable for any personal obligations of its owners.

Formation of a Corporation. Corporations must be legally formed, which means that the state in which it is incorporated must formally give its consent to the incorporation by chartering it. Setting up a corporation is therefore considerably more costly than setting up a sole proprietorship. Delaware has a particularly attractive legal environment for corporations, so many corporations choose to incorporate there. For jurisdictional purposes, a corporation is a citizen of the state in which it is incorporated. Most firms hire lawyers to create a corporate charter that includes formal articles of incorporation and a set of bylaws. The corporate charter specifies the initial rules that govern how the corporation is run.

Ownership of a Corporation. There is no limit on the number of owners a corporation can have. Because most corporations have many owners, each owner owns only a small fraction of the corporation. The entire ownership stake of a corporation is divided into shares known as **stock**. The collection of all the outstanding shares of a corporation is known as the **equity** of the corporation. An owner of a share of stock in the corporation is known as a **shareholder**, **stockholder**, or **equity holder** and is entitled to **dividend payments**, that is, payments made at the discretion of the corporation to its equity holders. Shareholders usually receive a share of the dividend payments that is proportional to the amount of stock they own. For example, a shareholder who owns 25% of the firm's shares will be entitled to 25% of the total dividend payment.

A unique feature of a corporation is that there is no limitation on who can own its stock. That is, an owner of a corporation need not have any special expertise or qualification. This feature allows free trade in the shares of the corporation and provides one of the most important advantages of organizing a firm as a corporation rather than as sole proprietorship, partnership, or LLC. Corporations can raise substantial amounts of capital because they can sell ownership shares to anonymous outside investors.

The availability of outside funding has enabled corporations to dominate the economy, as shown by Panel (b) of Figure 1.1. Let's take one of the world's largest firms, Wal-Mart Stores Inc. (brand name Walmart), as an example. Walmart had over 2 million employees, and reported annual revenue of \$486 billion in 2014. Indeed, the top five companies by sales volume in 2014 (Walmart, Sinopec, Royal Dutch Shell, Exxon Mobile, and BP) had combined sales exceeding \$2 trillion, an amount significantly larger than the total sales of the more than 22 million U.S. sole proprietorships.

Tax Implications for Corporate Entities

An important difference between the types of organizational forms is the way they are taxed. Because a corporation is a separate legal entity, a corporation's profits are subject to taxation separate from its owners' tax obligations. In effect, shareholders of a corporation pay taxes twice. First, the corporation pays tax on its profits, and then when the remaining profits are distributed to the shareholders, the shareholders pay their own personal income tax on this income. This system is sometimes referred to as double taxation.

EXAMPLE 1.1

Taxation of Corporate Earnings

Problem

You are a shareholder in a corporation. The corporation earns \$5 per share before taxes. After it has paid taxes, it will distribute the rest of its earnings to you as a dividend. The dividend is income to you, so you will then pay taxes on these earnings. The corporate tax rate is 40% and your tax rate on dividend income is 15%. How much of the earnings remains after all taxes are paid?

Solution

First, the corporation pays taxes. It earned \$5 per share, but must pay $0.40 \times \$5 = \2 to the government in corporate taxes. That leaves \$3 to distribute. However, you must pay $0.15 \times \$3 = \0.45 in income taxes on this amount, leaving $\$3 - \$0.45 = \$2.55$ per share after all taxes are paid. As a shareholder you only end up with \$2.55 of the original \$5 in earnings; the remaining $\$2 + \$0.45 = \$2.45$ is paid as taxes. Thus, your total effective tax rate is $2.45/5 = 49\%$.

S Corporations. The corporate organizational structure is the only organizational structure subject to double taxation. However, the U.S. Internal Revenue Code allows an exemption from double taxation for “S” corporations, which are corporations that elect subchapter S tax treatment. Under these tax regulations, the firm's profits (and losses) are not subject to corporate taxes, but instead are allocated directly to shareholders based on their ownership share. The shareholders must include these profits as income on their individual tax returns (even if no money is distributed to them). However, after the shareholders have paid income taxes on these profits, no further tax is due.

Corporate Taxation Around the World

Most countries offer investors in corporations some relief from double taxation. Thirty countries make up the Organization for Economic Co-operation and Development (OECD), and of these countries, only Ireland offers no relief whatsoever. A few countries, including Australia, Canada, Chile, Mexico and New Zealand, give shareholders a tax credit for the amount of corporate taxes paid, while others, such as Estonia and Finland, fully or partially exempt dividend income from individual taxes. The United States

offers partial relief by having a lower tax rate on dividend income than on other sources of income. As of 2015, for most investors qualified dividends are taxed at up to 20%, a rate significantly below their personal income tax rate. Despite this relief, the effective corporate tax rate in the U.S. is one of the highest in the world (and nearly 30% above the median for the OECD).*

*OECD Tax Database Table II.4

EXAMPLE 1.2

Taxation of S Corporation Earnings

Problem

Rework Example 1.1 assuming the corporation in that example has elected subchapter S treatment and your tax rate on non-dividend income is 30%.

Solution

In this case, the corporation pays no taxes. It earned \$5 per share. Whether or not the corporation chooses to distribute or retain this cash, you must pay $0.30 \times \$5 = \1.50 in income taxes, which is substantially lower than the \$2.45 paid in Example 1.1.

The government places strict limitations on the qualifications for subchapter S tax treatment. In particular, the shareholders of such corporations must be individuals who are U.S. citizens or residents, and there can be no more than 100 of them. Because most corporations have no restrictions on who owns their shares or the number of shareholders, they cannot qualify for subchapter S treatment. Thus most large corporations are “**C**” **corporations**, which are corporations subject to corporate taxes. S corporations account for less than one quarter of all corporate revenue.

CONCEPT CHECK

1. What is a limited liability company (LLC)? How does it differ from a limited partnership?
2. What are the advantages and disadvantages of organizing a business as a corporation?

1.2 Ownership Versus Control of Corporations

It is often not feasible for the owners of a corporation to have direct control of the firm because there are sometimes many owners, each of whom can freely trade his or her stock. That is, in a corporation, direct control and ownership are often separate. Rather than the owners, the *board of directors* and *chief executive officer* possess direct control of the corporation. In this section, we explain how the responsibilities for the corporation are divided between these two entities and how together they shape and execute the goals of the firm.

The Corporate Management Team

The shareholders of a corporation exercise their control by electing a **board of directors**, a group of people who have the ultimate decision-making authority in the corporation.

David Viniar is Chief Financial Officer and head of the Operations, Technology and Finance Division at Goldman Sachs—the last major investment bank to convert from a partnership to a corporation. As the firm's CFO, he played a leading role in the firm's conversion to a corporation in 1999 and charting the firm's course through the financial crisis of 2008–2009.

QUESTION: *What are the advantages of partnerships and corporations?*

ANSWER: We debated this question at length when we were deciding whether to go public or stay a private partnership in the mid-1990s. There were good arguments on both sides. Those in favor of going public argued we needed greater financial and strategic flexibility to achieve our aggressive growth and market leadership goals. As a public corporation, we would have a more stable equity base to support growth and disperse risk; increased access to large public debt markets; publicly traded securities with which to undertake acquisitions and reward and motivate our employees; and a simpler and more transparent structure with which to increase scale and global reach.

Those against going public argued our private partnership structure worked well and would enable us to achieve our financial and strategic goals. As a private partnership, we could generate enough capital internally and in the private placement markets to fund growth; take a longer-term view of returns on our investments with less focus on earnings volatility, which is not valued in public companies; and retain voting control and alignment of the partners and the firm.

A big perceived advantage of our private partnership was its sense of distinctiveness and mystique, which reinforced our culture of teamwork and excellence and helped differentiate us from our competitors. Many questioned whether the special qualities of our culture would survive if the firm went public.

QUESTION: *What was the driving force behind the conversion?*

ANSWER: We ultimately decided to go public for three main reasons: to secure permanent capital to grow; to be able to use publicly traded securities to finance strategic acquisitions; and to enhance the culture of ownership and gain compensation flexibility.

INTERVIEW WITH DAVID VINIAR



QUESTION: *Did the conversion achieve its goals?*

ANSWER: Yes. As a public company, we have a simpler, bigger and more permanent capital base, including enhanced long-term borrowing capacity in the public debt markets. We have drawn on substantial capital resources to serve clients, take advantage of new business opportunities, and better control our own destiny through changing economic and business conditions. We have been able to use stock to finance key acquisitions and support large strategic and financial investments. Given how the stakes in our industry changed, how capital demands grew, going public when we did fortunately positioned us to compete effectively through the cycle.

Our distinctive culture of teamwork and excellence has thrived in public form, and our equity compensation programs turned out better than we could have hoped. Making everyone at Goldman Sachs an owner, rather than just 221 partners, energized all our employees. The growing size and scope of our business—not the change to public form—has presented the greatest challenges to the positive aspects of our culture.

QUESTION: *What prompted Goldman's decision to become a bank holding company in Fall 2008?*

ANSWER: The market environment had become extraordinarily unstable following the collapse of Bear Stearns in March 2008. There was an increased focus on the SEC-supervised broker/dealer business model, and in September, market sentiment had become increasingly negative with growing concerns over Lehman Brothers' solvency. Following the bankruptcy of Lehman Brothers and the sale of Merrill Lynch in the middle of September, and notwithstanding the reporting of quite strong earnings by both Goldman Sachs and Morgan Stanley, it became clear to us that the market viewed oversight by the Federal Reserve and the ability to source insured bank deposits as offering a greater degree of safety and soundness. By changing our status, we gained all the benefits available to our commercial banking peers, including access to permanent liquidity and funding, without affecting our ability to operate or own any of our current businesses or investments.

In most corporations, each share of stock gives a shareholder one vote in the election of the board of directors, so investors with the most shares have the most influence. When one or two shareholders own a very large proportion of the outstanding stock, these shareholders may either be on the board of directors themselves, or they may have the right to appoint a number of directors.

The board of directors makes rules on how the corporation should be run (including how the top managers in the corporation are compensated), sets policy, and monitors the performance of the company. The board of directors delegates most decisions that involve day-to-day running of the corporation to its management. The **chief executive officer (CEO)** is charged with running the corporation by instituting the rules and policies set by the board of directors. The size of the rest of the management team varies from corporation to corporation. The separation of powers within corporations between the board of directors and the CEO is not always distinct. In fact, it is not uncommon for the CEO also to be the chairman of the board of directors. The most senior financial manager is the **chief financial officer (CFO)**, who often reports directly to the CEO. Figure 1.2 presents part of a typical organizational chart for a corporation, highlighting the key positions a financial manager may take.

The Financial Manager

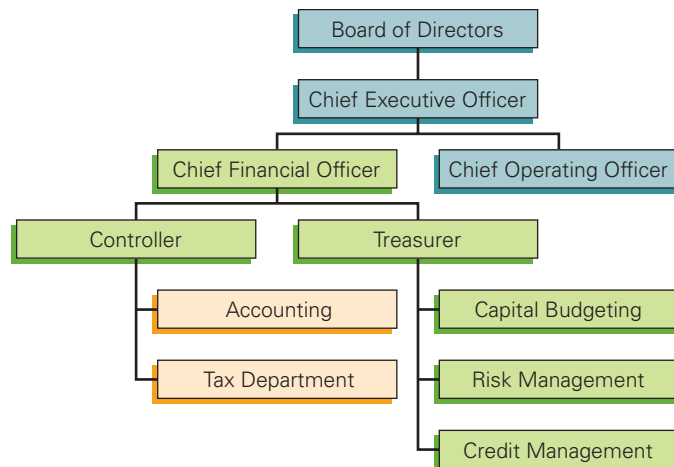
Within the corporation, financial managers are responsible for three main tasks: making investment decisions, making financing decisions, and managing the firm's cash flows.

Investment Decisions. The financial manager's most important job is to make the firm's investment decisions. The financial manager must weigh the costs and benefits of all investments and projects and decide which of them qualify as good uses of the money stockholders have invested in the firm. These investment decisions fundamentally shape what the firm does and whether it will add value for its owners. In this book, we will develop the tools necessary to make these investment decisions.

FIGURE 1.2

Organizational Chart of a Typical Corporation

The board of directors, representing the stockholders, controls the corporation and hires the Chief Executive Officer who is then responsible for running the corporation. The Chief Financial Officer oversees the financial operations of the firm, with the Controller managing both tax and accounting functions, and the Treasurer responsible for capital budgeting, risk management, and credit management activities.



GLOBAL FINANCIAL CRISIS

The Dodd-Frank Act

In response to the 2008 financial crisis, the U.S. federal government reevaluated its role in the control and management of financial institutions and private corporations. Signed into law on July 21, 2010, the **Dodd-Frank Wall Street Reform and Consumer Protection Act** brought a sweeping change to financial regulation in response to widespread calls for financial regulatory system reform after the near collapse of the world's financial system in the fall of 2008 and the ensuing global credit crisis. History indeed repeats itself: It was in the wake of the 1929 stock market crash and subsequent Great Depression that Congress passed the Glass-Steagall Act establishing the Federal Deposit Insurance Corporation (FDIC) and instituted significant bank reforms to regulate transactions between commercial banks and securities firms.

The Dodd-Frank Act aims to (i) promote U.S. financial stability by “improving accountability and transparency in

the financial system,” (ii) put an end to the notion of “too big to fail,” (iii) “protect the American taxpayer by ending bailouts,” and (iv) “protect consumers from abusive financial services practices.” Time will tell whether the Act will actually achieve these important goals.

Implementing the wide-ranging financial reforms in the Dodd-Frank Act requires the work of many federal agencies, either through rulemaking or other regulatory actions. As of mid-2015, five years since Dodd-Frank's passage, 247 of the reforms have been finalized, providing a clear picture of the Dodd-Frank regulatory framework. But another 143 rules or actions await completion. While only two-thirds of the rules have been finalized, many of the core reforms have been or are nearing completion. For instance, the Volcker Rule, which bars banks that take government-insured deposits from making speculative investments took full effect in late July of 2015.

Financing Decisions. Once the financial manager has decided which investments to make, he or she also decides how to pay for them. Large investments may require the corporation to raise additional money. The financial manager must decide whether to raise more money from new and existing owners by selling more shares of stock (equity) or to borrow the money (debt). In this book, we will discuss the characteristics of each source of funds and how to decide which one to use in the context of the corporation's overall mix of debt and equity.

Cash Management. The financial manager must ensure that the firm has enough cash on hand to meet its day-to-day obligations. This job, also commonly known as managing working capital, may seem straightforward, but in a young or growing company, it can mean the difference between success and failure. Even companies with great products require significant amounts of money to develop and bring those products to market. Consider the \$150 million Apple spent during its secretive development of the iPhone, or the costs to Boeing of producing the 787—the firm spent billions of dollars before the first 787 left the ground. A company typically burns through a significant amount of cash developing a new product before its sales generate income. The financial manager's job is to make sure that access to cash does not hinder the firm's success.

The Goal of the Firm

In theory, the goal of a firm should be determined by the firm's owners. A sole proprietorship has a single owner who runs the firm, so the goals of a sole proprietorship are the same as the owner's goals. But in organizational forms with multiple owners, the appropriate goal of the firm—and thus of its managers—is not as clear.

Many corporations have thousands of owners (shareholders). Each owner is likely to have different interests and priorities. Whose interests and priorities determine the goals of the firm? Later in the book, we examine this question in more detail. However, you might be surprised to learn that the interests of shareholders are aligned for many, if not most, important decisions. That is because, regardless of their own personal financial position and stage in life, all the shareholders will agree that they are better off if management makes decisions that increase the value of their shares. For example, by July 2015, Apple shares were worth over 120 times as

much as they were in October 2001, when the first iPod was introduced. Clearly, regardless of their preferences and other differences, all investors who held shares of Apple stock over this period have benefited from the investment decisions Apple's managers have made.

The Firm and Society

Are decisions that increase the value of the firm's equity beneficial for society as a whole? Most often they are. While Apple's shareholders have become much richer since 2001, its customers also are better off with products like the iPod and iPhone that they might otherwise never have had. But even if the corporation only makes its shareholders better off, as long as nobody else is made worse off by its decisions, increasing the value of equity is good for society.

The problem occurs when increasing the value of equity comes at the expense of others. Consider a corporation that, in the course of business, pollutes the environment and does not pay the costs to clean up the pollution. Alternatively, a corporation may not itself pollute, but use of its products may harm the environment. In such cases, decisions that increase shareholder wealth can be costly for society as whole.

The 2008 financial crisis highlighted another example of decisions that can increase shareholder wealth but are costly for society. In the early part of the last decade, banks took on excessive risk. For a while, this strategy benefited the banks' shareholders. But when the bets went bad, the resulting financial crisis harmed the broader economy.

When the actions of the corporation impose harm on others in the economy, appropriate public policy and regulation is required to assure that corporate interests and societal interests remain aligned. Sound public policy should allow firms to continue to pursue the maximization of shareholder value in a way that benefits society overall.

Ethics and Incentives within Corporations

But even when all the owners of a corporation agree on the goals of the corporation, these goals must be implemented. In a simple organizational form like a sole proprietorship, the owner, who runs the firm, can ensure that the firm's goals match his or her own. But a corporation is run by a management team, separate from its owners, giving rise to conflicts of interest. How can the owners of a corporation ensure that the management team will implement their goals?

Agency Problems. Many people claim that because of the separation of ownership and control in a corporation, managers have little incentive to work in the interests of the shareholders when this means working against their own self-interest. Economists call this an **agency problem**—when managers, despite being hired as the agents of shareholders, put their own self-interest ahead of the interests of shareholders. Managers face the ethical dilemma of whether to adhere to their responsibility to put the interests of shareholders first, or to do what is in their own personal best interest.

This agency problem is commonly addressed in practice by minimizing the number of decisions managers must make for which their own self-interest substantially differs from the interests of the shareholders. For example, managers' compensation contracts are designed to ensure that most decisions in the shareholders' interest are also in the managers' interests; shareholders often tie the compensation of top managers to the corporation's profits or perhaps to its stock price. There is, however, a limitation to this strategy. By tying compensation too closely to performance, the shareholders might be asking managers to take on more risk than they are comfortable taking. As a result, managers may not make decisions that the shareholders want them to, or it might be hard to find talented managers

GLOBAL FINANCIAL CRISIS

The Dodd-Frank Act on Corporate Compensation and Governance

Compensation is one of the most important conflicts of interest between corporate executives and shareholders. To limit senior corporate executives' influence over their own compensation and prevent excessive compensation, the Act directs the SEC to adopt new rules that:

- Mandate the independence of a firm's compensation committee and its advisers.
- Provide shareholders the opportunity to approve—in a non-binding, advisory vote—the compensation of executive officers at least once every three years (referred to as a “Say-on-Pay” vote).
- Require firm disclosure and shareholder approval of large bonus payments (so-called “golden parachutes”) to ousted senior executives as the result of a takeover.
- Require disclosure of the relationship of executive pay to the company's performance, as well as the ratio between the CEO's total compensation and that of the median employee.
- Require disclosure of whether executives are permitted to hedge their stock or option holdings.
- Create “clawback” provisions that allow firms to recoup compensation paid based on erroneous financial results.

willing to accept the job. On the other hand, if compensation contracts reduce managers' risk by rewarding good performance but limiting the penalty associated with poor performance, managers may have an incentive to take excessive risk.

Further potential for conflicts of interest and ethical considerations arise when some stakeholders in the corporation benefit and others lose from a decision. Shareholders and managers are two stakeholders in the corporation, but others include the regular employees and the communities in which the company operates, for example. Managers may decide to take the interests of other stakeholders into account in their decisions, such as keeping a loss-generating factory open because it is the main provider of jobs in a small town, paying above-market wages to factory workers in a developing country, or operating a plant at a higher environmental standard than local law mandates.

In some cases, these actions that benefit other stakeholders also benefit the firm's shareholders by creating a more dedicated workforce, generating positive publicity with customers, or other indirect effects. In other instances, when these decisions benefit other stakeholders at shareholders' expense, they represent a form of corporate charity. Indeed, many if not most corporations explicitly donate (on behalf of their shareholders) to local and global charitable and political causes. For example, in 2013, Walmart gave \$312 million in cash to charity (making it the largest corporate donor of cash in that year). These actions are costly and reduce shareholder wealth. Thus, while some shareholders might support such policies because they feel that they reflect their own moral and ethical priorities, it is unlikely that all shareholders will feel this way, leading to potential conflicts of interest amongst shareholders.

Citizens United v. Federal Election Commission

On January 21, 2010, the U.S. Supreme Court ruled on what some scholars have argued is the most important First Amendment case in many years. In *Citizens United v. Federal Election Commission* the Court held, in a controversial 5–4 decision, that the First Amendment allows corporations and unions to make political expenditures in support of a

particular candidate. This ruling overturned existing restrictions on political campaigning by corporations. But because it is highly unlikely that all shareholders of a corporation would unanimously support a particular candidate, allowing such activities effectively guarantees a potential conflict of interest.

The CEO's Performance. Another way shareholders can encourage managers to work in the interests of shareholders is to discipline them if they don't. If shareholders are unhappy with a CEO's performance, they could, in principle, pressure the board to oust the CEO. Disney's Michael Eisner, Hewlett Packard's Carly Fiorina, and Barclay's Antony Jenkins were all reportedly forced to resign by their boards. Despite these high-profile examples, directors and top executives are rarely replaced through a grassroots shareholder uprising. Instead, dissatisfied investors often choose to sell their shares. Of course, somebody must be willing to buy the shares from the dissatisfied shareholders. If enough shareholders are dissatisfied, the only way to entice investors to buy (or hold on to) the shares is to offer them a low price. Similarly, investors who see a well-managed corporation will want to purchase shares, which drives the stock price up. Thus, the stock price of the corporation is a barometer for corporate leaders that continuously gives them feedback on their shareholders' opinion of their performance.

When the stock performs poorly, the board of directors might react by replacing the CEO. In some corporations, however, the senior executives are entrenched because boards of directors do not have the will to replace them. Often the reluctance to fire results because the board members are close friends of the CEO and lack objectivity. In corporations in which the CEO is entrenched and doing a poor job, the expectation of continued poor performance will decrease the stock price. Low stock prices create a profit opportunity. In a **hostile takeover**, an individual or organization—sometimes known as a corporate raider—can purchase a large fraction of the stock and acquire enough votes to replace the board of directors and the CEO. With a new superior management team, the stock is a much more attractive investment, which would likely result in a price rise and a profit for the corporate raider and the other shareholders. Although the words “hostile” and “raider” have negative connotations, corporate raiders themselves provide an important service to shareholders. The mere threat of being removed as a result of a hostile takeover is often enough to discipline bad managers and motivate boards of directors to make difficult decisions. Consequently, when a corporation's shares are publicly traded, a “market for corporate control” is created that encourages managers and boards of directors to act in the interests of their shareholders.

Corporate Bankruptcy. Ordinarily, a corporation is run on behalf of its shareholders. But when a corporation borrows money, the holders of the firm's debt also become investors in the corporation. While the debt holders do not normally exercise control over the firm, if the corporation fails to repay its debts, the debt holders are entitled to seize the assets of the corporation in compensation for the default. To prevent such a seizure, the firm may attempt to renegotiate with the debt holders, or file for bankruptcy protection in a federal court. (We describe the details of the bankruptcy process and its implications for corporate decisions in much more detail in Part 5 of the textbook.) Ultimately, however, if the firm is unable to repay or renegotiate with the debt holders, the control of the corporation's assets will be transferred to them.

Thus, when a firm fails to repay its debts, the end result is a change in ownership of the firm, with control passing from equity holders to debt holders. Importantly, bankruptcy need not result in a **liquidation** of the firm, which involves shutting down the business and selling off its assets. Even if control of the firm passes to the debt holders, it is in the debt holders' interest to run the firm in the most profitable way possible. Doing so often means keeping the business operating. For example, in 1990, Federated Department Stores declared bankruptcy. One of its best-known assets at the time was Bloomingdale's, a nationally recognized department store. Because Bloomingdale's was a profitable business,

Airlines in Bankruptcy

On December 9, 2002, United Airlines filed for bankruptcy protection following an unsuccessful attempt to convince the federal government to bail out the company's investors by providing loan guarantees. Although United remained in bankruptcy for the next three years, it continued to operate and fly passengers, and even expanded capacity in some markets. One of those expansions was "Ted," an ill-fated attempt by United to start a budget airline to compete directly with Southwest Airlines. In short, although United's original shareholders were wiped out, as far as customers were concerned it was business as usual. People continued to book tickets and United continued to fly and serve them.

It is tempting to think that when a firm files for bankruptcy, things are "over." But often, rather than liquidate the firm, bondholders and other creditors are better off allowing the firm to continue operating as a going concern. United was just one of many airlines to move in and out of bankruptcy since 2002; others include U.S. Airways, Air Canada, Hawaiian Airlines, Northwest Airlines, and Delta Airlines. In November 2011, American Airlines became the latest airline to declare bankruptcy. Like United in 2002, American continued to operate while it cut costs and reorganized, returning to profitability in mid-2012. American ultimately settled with creditors in December 2013 as part of a merger agreement with US Airways.

neither equity holders nor debt holders had any desire to shut it down, and it continued to operate in bankruptcy. In 1992, when Federated Department Stores was reorganized and emerged from bankruptcy, Federated's original equity holders had lost their stake in Bloomingdale's, but this flagship chain continued to perform well for its new owners, and its value as a business was not adversely affected by the bankruptcy.

Thus, a useful way to understand corporations is to think of there being two sets of investors with claims to its cash flows—debt holders and equity holders. As long as the corporation can satisfy the claims of the debt holders, ownership remains in the hands of the equity holders. If the corporation fails to satisfy debt holders' claims, debt holders may take control of the firm. Thus, a corporate bankruptcy is best thought of as a *change in ownership* of the corporation, and not necessarily as a failure of the underlying business.

CONCEPT CHECK

1. What are the three main tasks of a financial manager?
2. What is a principal-agent problem that may exist in a corporation?
3. How may a corporate bankruptcy filing affect the ownership of a corporation?

1.3 The Stock Market

As we have discussed, shareholders would like the firm's managers to maximize the value of their investment in the firm. The value of their investment is determined by the price of a share of the corporation's stock. Because **private companies** have a limited set of shareholders and their shares are not regularly traded, the value of their shares can be difficult to determine. But many corporations are **public companies**, whose shares trade on organized markets called a **stock market** (or **stock exchange**). Figure 1.3 shows the major exchanges worldwide, by total value of listed stocks and trading volume.

These markets provide *liquidity* and determine a market price for the company's shares. An investment is said to be **liquid** if it is possible to sell it quickly and easily for a price very close to the price at which you could contemporaneously buy it. This liquidity is attractive to outside investors, as it provides flexibility regarding the timing and duration of their investment in the firm. In addition, the research and trading of participants in these markets give rise to share prices that provide constant feedback to managers regarding investors' views of their decisions.

Primary and Secondary Stock Markets

When a corporation itself issues new shares of stock and sells them to investors, it does so on the **primary market**. After this initial transaction between the corporation and investors, the shares continue to trade in a **secondary market** between investors without the involvement of the corporation. For example, if you wish to buy 100 shares of Starbucks Coffee, you would place an order on a stock exchange, where Starbucks trades under the ticker symbol SBUX. You would buy your shares from someone who already held shares of Starbucks, not from Starbucks itself. Because firms only occasionally issue new shares, secondary market trading accounts for the vast majority of trading in the stock market.

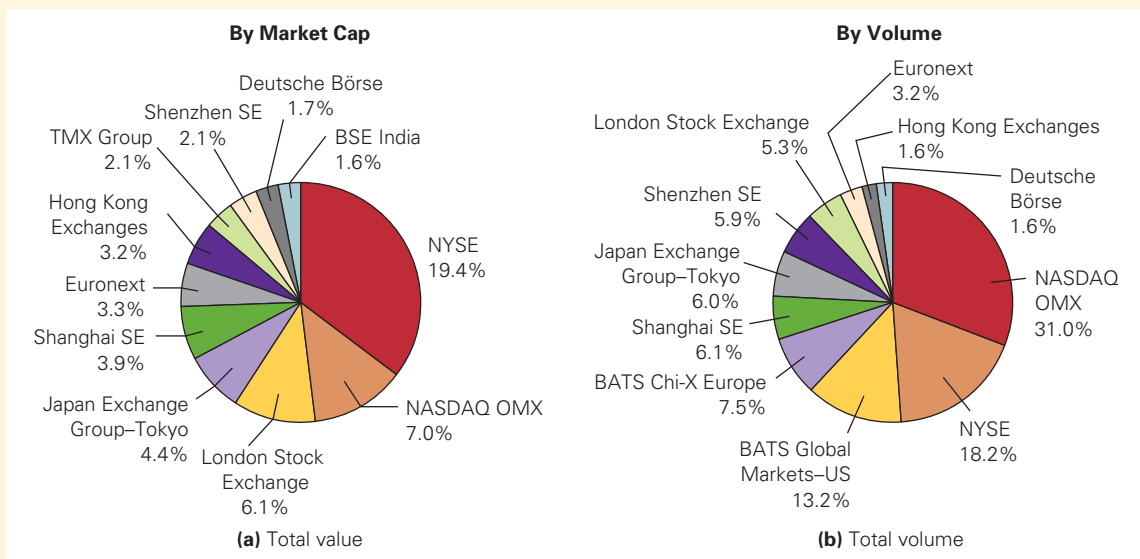
Traditional Trading Venues

Historically, a firm would choose one stock exchange on which to list its stock, and almost all trade in the stock would occur on that exchange. In the U.S., the two most important exchanges are the New York Stock Exchange (NYSE) and the National Association of Security Dealers Automated Quotation (NASDAQ).

Prior to 2005, almost all trade on the NYSE took place on the exchange's trading floor in lower Manhattan. **Market makers** (known then on the NYSE as **specialists**) matched buyers and sellers. They posted two prices for every stock in which they made a market: the price at which they were willing to *buy* the stock (the **bid price**) and the price at which they were willing to *sell* the stock (the **ask price**). When a customer arrived and wanted to make a trade at these prices, the market maker would honor the posted prices (up to a limited number of shares) and make the trade even when they did not have another customer willing to take the other side of the trade. In this way, market makers provided **liquidity** by ensuring that market participants always had somebody to trade with.

FIGURE 1.3

Worldwide Stock Markets Ranked by Two Common Measures



The 10 biggest stock markets in the world (a) by total value of all domestic corporations listed on the exchange at year-end 2014 and (b) by total volume of shares traded on the exchange in 2014.

Source: www.world-exchanges.org

As Chief Economist and Senior Vice President for NASDAQ, Dr. Frank Hatheway leads a team of 20 professionals who serve as an internal consultancy for the NASDAQ markets. Their work includes designing new features, evaluating operations markets, and advising on strategic initiatives.

QUESTION: *Compared to 15 years ago, the number of potential trading venues for investors has changed dramatically. Who have these changes benefited?*

ANSWER: The number of trading venues has increased dramatically. In 2000 you placed an order on NASDAQ or the NYSE, and the majority of trading activity in that stock occurred on the same market as your order. That's not the case anymore. Your trade may be executed on the National Stock Exchange, BATS, or one of 10 other exchanges. To deal with the soaring number of venues, trading became highly automated and highly competitive, benefiting both individual and institutional investors. A fast retail trade in the 1980s took about three minutes and cost over \$100 (in 1980s money). Now it's a mouse click, browser refresh, and maybe \$20 (in 2016 money). Trading costs for individual investors are down over 90 percent since 2000. Institutional-size block orders are also cheaper and easier to trade today.

Automation has virtually removed traditional equity traders like the market makers, specialists, and floor brokers at the exchanges. As the head of the trading desk for a major firm quipped around 2006, "I used to have 100 traders and 10 IT guys. I now have 100 IT guys and 10 traders." The once bustling New York Stock Exchange floor is now essentially a TV studio.

QUESTION: *How have these changes affected market liquidity?*

ANSWER: Liquidity is very transitory. The computer algorithms controlling trading constantly enter orders into the market and remove orders if the order fails to trade or if market conditions change. The algorithms quickly re-enter removed orders into the market, leading to rapidly changing prices and quantities. Also, numerous studies show that there is more liquidity in the market today. To control an order 15 years ago, you phoned your broker with your instructions. Today, the algorithm you selected controls

INTERVIEW WITH FRANK HATHEWAY



the order and can change the order almost instantly. Because computers have more control over orders than human traders did, there is less risk associated with placing an order. Consequently there are more orders and greater liquidity.

QUESTION: *How has NASDAQ been affected by these changes and what does the future hold?*

ANSWER: NASDAQ has become an innovative, technologically savvy company—much like the companies we list. Fifteen years ago we operated a single stock market in the United States. Thanks to increased technological efficiency, today we operate three stock markets, three listed-

options markets, and a futures market. Operating these seven markets requires less than half the personnel required for a single market 15 years ago. To compete in this environment, NASDAQ had to develop a better trading system to handle our increased order volume. Order volume that took an entire day to process 15 years ago, today takes a few seconds. We've also transformed our culture from supporting an industry based on human traders to one based on algorithmic traders and the IT professionals who design those algorithms.

QUESTION: *Is High Frequency Trading a cause for concern in the market? Should it be limited?*

ANSWER: Specific concerns about High Frequency Trading are generally about market disruptions and manipulation, and cases center around the operation of trading algorithms. I believe market oversight is evolving to appropriately address disruptive or manipulative activity.

These days essentially every order in the United States is handled by a computer trading algorithm. Simply put, we are all High Frequency Traders. Consequently, limiting High Frequency Trading should not be a policy objective. What should be a policy objective is making sure that equity markets benefit investors and issuers by ensuring that the algorithms do not disrupt the markets and that they operate in a manner that is fair to investors. The market exists to support capital formation and economic growth. Market operators such as NASDAQ work with regulators and others to look after the interests of investors and issuers.

In contrast to the NYSE, the NASDAQ market never had a trading floor. Instead, all trades were completed over the phone or on a computer network. An important difference between the NYSE and NASDAQ was that on the NYSE, each stock had only one market maker. On the NASDAQ, stocks had multiple market makers who competed with one another. Each market maker posted bid and ask prices on the NASDAQ network that were viewed by all participants.

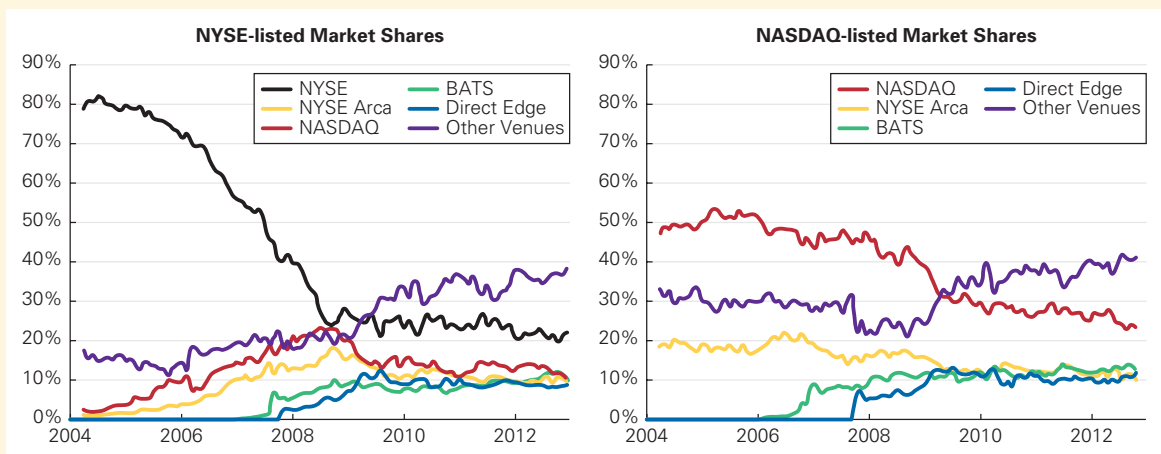
Market makers make money because ask prices are higher than bid prices. This difference is called the **bid-ask spread**. Customers always buy at the ask (the higher price) and sell at the bid (the lower price). The bid-ask spread is a **transaction cost** investors pay in order to trade. Because specialists on the NYSE took the other side of the trade from their customers, this cost accrued to them as a profit. This was the compensation they earned for providing a liquid market by standing ready to honor any quoted price. Investors also paid other forms of transactions costs like commissions.

New Competition and Market Changes

Stock markets have gone through enormous changes in the last decade. In 2005, the NYSE and NASDAQ exchanges accounted for over 75% of all trade in U.S. stocks. Since that time, however, they have faced increasing competition from new fully electronic exchanges, as well as alternative trading systems. Today, these new entrants handle more than 50% of all trades, as shown in Figure 1.4.

With this change in market structure, the role of an official market maker has largely disappeared. Because all transactions occur electronically with computers matching buy and sell orders, anyone can make a market in a stock by posting a **limit order**—an order to buy or sell a set amount at a fixed price. For example, a limit buy order might be an order to buy 100 shares of IBM at a price of \$138/share. The bid-ask spread of a stock is determined

FIGURE 1.4



Distribution of trading volume for NYSE-listed shares (left panel) and NASDAQ-listed shares (right panel). NYSE-Arca is the electronic trading platform of the NYSE. BATS and Direct Edge merged in 2014; these new electronic exchanges now handle about 20% of all trades. Other venues, including internal dealer platforms and so called “dark pools,” accounted for almost 40% of all trades in 2015.

Source: J. Angel, L. Harris, and C. Spatt, “Equity Trading in the 21st Century: An Update,” *Quarterly Journal of Finance* 5 (2015): 1–39.

by the outstanding limit orders. The limit sell order with the lowest price is the ask price. The limit buy order with the highest price is the bid price. Traders make the market in the stock by posting limit buy and sell orders. The collection of all limit orders is known as the **limit order book**. Exchanges make their limit order books public so that investors (or their brokers) can see the best bid and ask prices when deciding where to trade.

Traders who post limit orders provide the market with liquidity. On the other hand, traders who place **market orders**—orders that trade immediately at the best outstanding limit order—are said to be “takers” of liquidity. Providers of liquidity earn the bid-ask spread, but in so doing they risk the possibility of their orders becoming stale: When news about a stock arrives that causes the price of that stock to move, smart traders will quickly take advantage of the existing limit orders by executing trades at the old prices. To protect themselves against this possibility, liquidity providers need to constantly monitor the market, cancelling old orders and posting new orders when appropriate. So-called **high frequency traders (HFTs)** are a class of traders who, with the aid of computers, will place, update, cancel, and execute trades many times per second in response to new information as well as other orders, profiting both by providing liquidity and by taking advantage of stale limit orders.

Dark Pools

When trading on an exchange, investors are guaranteed the opportunity to trade immediately at the current bid or ask price, and transactions are visible to all traders when they occur. In contrast, alternative trading systems called **dark pools** do not make their limit order books visible. Instead, these dark pools offer investors the ability to trade at a better price (for example, the average of the bid and ask, thus saving the bid-ask spread), with the tradeoff being that the order might not be filled if an excess of either buy or sell orders is received. Trading on a dark pool is therefore attractive to traders who do not want to reveal their demand and who are willing to sacrifice the guarantee of immediacy for a potentially better price.

When dark pools are included, researchers estimate that in the U.S. alone there could be as many 50 venues in which to trade stocks. These venues compete with one another for order volume. Because traders value liquid markets, an important area of competition is liquidity—exchanges try to ensure that their limit order books are deep, that is, that they contain many orders. As a result, exchanges have been experimenting with different rules designed to encourage traders who provide liquidity and discourage traders who take advantage of stale limit orders. For example, some trading venues pay traders to post limit orders and charge traders who place market orders. Others pay for orders from retail investors and impose additional charges on high frequency trading. The proliferation of exchange venues has generated a wide variety of different compensation schemes. Indeed, BATS operates different markets with different rules, essentially tailoring markets to the perceived needs of customers. It is highly unlikely that we have seen the end of these changes. Stock markets remain in a state of flux, and only time will tell what the eventual shake out will look like.

CONCEPT CHECK

1. What are the important changes that have occurred in stock markets over the last decade?
2. What is the limit order book?
3. Why are people who post limit orders termed “providers” of liquidity?

1.1 The Four Types of Firms

- There are four types of firms in the United States: sole proprietorships, partnerships, limited liability companies, and corporations.
- Firms with unlimited personal liability include sole proprietorships and partnerships.
- Firms with limited liability include limited partnerships, limited liability companies, and corporations.
- A corporation is a legally defined artificial being (a judicial person or legal entity) that has many of the same legal powers as people. It can enter into contracts, acquire assets, incur obligations, and, as we have already established, it enjoys the protection under the U.S. Constitution against the seizure of its property.
- The shareholders in a C corporation effectively must pay tax twice. The corporation pays tax once and then investors must pay personal tax on any funds that are distributed.
- S corporations are exempt from the corporate income tax.

1.2 Ownership Versus Control of Corporations

- The ownership of a corporation is divided into shares of stock collectively known as equity. Investors in these shares are called shareholders, stockholders, or equity holders.
- The ownership and control of a corporation are separated. Shareholders exercise their control indirectly through the board of directors.
- Financial managers within the firm are responsible for three main tasks: making investment decisions, making financing decisions, and managing the firm's cash flows.
- Good public policy should ensure that when firms take actions that benefit their shareholders, they are also benefiting society.
- While the firm's shareholders would like managers to make decisions that maximize the firm's share price, managers often must balance this objective with the desires of other stakeholders (including themselves).
- Corporate bankruptcy can be thought of as a change in ownership and control of the corporation. The equity holders give up their ownership and control to the debt holders.

1.3 The Stock Market

- The shares of public corporations are traded on stock markets. The shares of private corporations do not trade on a stock market.
- Traders provide liquidity in stock markets by posting limit orders.
- The bid-ask spread is determined by the best bid and offer prices in the limit order book.

Key Terms

agency problem *p. 43*

ask price *p. 47*

bid-ask spread *p. 49*

bid price *p. 47*

board of directors *p. 39*

"C" corporations *p. 39*

chief executive officer (CEO) *p. 41*

chief financial officer (CFO) *p. 41*

corporation *p. 37*

dark pools *p. 50*

dividend payments *p. 37*

Dodd-Frank Act *p. 42*

equity *p. 37*

equity holder *p. 37*

high frequency traders (HFTs) *p. 50*

hostile takeover *p. 45*

limit order *p. 49*

limit order book *p. 50*

limited liability *p. 36*

limited liability company (LLC) *p. 37*

limited partnership *p. 36*

liquid *p. 46*

liquidation *p. 45*

liquidity *p. 47*

market makers <i>p.</i> 47	shareholder <i>p.</i> 37
market orders <i>p.</i> 50	sole proprietorship <i>p.</i> 35
partnership <i>p.</i> 36	specialists <i>p.</i> 47
primary market <i>p.</i> 47	stock <i>p.</i> 37
private companies <i>p.</i> 46	stock market (or stock exchange) <i>p.</i> 46
public companies <i>p.</i> 46	stockholder <i>p.</i> 37
“S” corporations <i>p.</i> 38	transaction cost <i>p.</i> 49
secondary market <i>p.</i> 47	

Further Reading

Readers interested in John Marshall’s decision that led to the legal basis for the corporation can find a more detailed description of the decision in J. Smith, *John Marshall: Definer of a Nation* (Henry Holt, 1996): 433–38.

An informative discussion that describes the objective of a corporation can be found in M. Jensen, “Value Maximization, Stakeholder Theory, and the Corporate Objective Function,” *Journal of Applied Corporate Finance* (Fall 2001): 8–21.

For background on what determines the goals of corporate managers and how they differ from shareholders’ goals, read M. Jensen and W. Meckling, “Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure,” *Journal of Financial Economics* 3 (1976): 305–60; J. Core, W. Guay, and D. Larker, “Executive Equity Compensation and Incentives: A Survey,” *Federal Reserve Bank of New York Economic Policy Review* 9 (April 2003): 27–50.

The following papers explain corporate governance and ownership around the world: F. Barca and M. Becht, *The Control of Corporate Europe* (Oxford University Press, 2001); D. Denis and J. McConnell, “International Corporate Governance,” *Journal of Financial Quantitative Analysis* 38 (2003): 1–36; R. La Porta, F. Lopez-de-Silanes, and A. Shleifer, “Corporate Ownership Around the World,” *Journal of Finance* 54 (1999): 471–517. Readers interested in a more detailed discussion of how taxes affect incorporation can consult J. MacKie-Mason and R. Gordon, “How Much Do Taxes Discourage Incorporation?” *Journal of Finance* 52 (1997): 477–505.

The following papers provide a summary of the recent changes in stock markets: J. Angel, L. Harris, and C. Spatt, “Equity Trading in the 21st Century: An Update,” *Quarterly Journal of Finance* 5 (2015): 1–39 and M. O’Hara, “High frequency market microstructure,” *Journal of Financial Economics* 116 (2015) 257–270.

Problems

All problems are available in [MyFinanceLab](#).

The Four Types of Firms

1. What is the most important difference between a corporation and *all* other organizational forms?
2. What does the phrase *limited liability* mean in a corporate context?
3. Which organizational forms give their owners limited liability?
4. What are the main advantages and disadvantages of organizing a firm as a corporation?
5. Explain the difference between an S corporation and a C corporation.



6. You are a shareholder in a C corporation. The corporation earns \$2 per share before taxes. Once it has paid taxes it will distribute the rest of its earnings to you as a dividend. The corporate tax rate is 40% and the personal tax rate on (both dividend and non-dividend) income is 30%. How much is left for you after all taxes are paid?



7. Repeat Problem 6 assuming the corporation is an S corporation.

Ownership Versus Control of Corporations

8. You have decided to form a new start-up company developing applications for the iPhone. Give examples of the three distinct types of financial decisions you will need to make.
9. When a pharmaceutical company develops a new drug, it often receives patent protection for that medication, allowing it to charge a higher price. Explain how this public policy of providing patent protection might help align the corporation's interests with society's interests.
10. Corporate managers work for the owners of the corporation. Consequently, they should make decisions that are in the interests of the owners, rather than their own. What strategies are available to shareholders to help ensure that managers are motivated to act this way?
11. Suppose you are considering renting an apartment. You, the renter, can be viewed as an agent while the company that owns the apartment can be viewed as the principal. What principal-agent conflicts do you anticipate? Suppose, instead, that you work for the apartment company. What features would you put into the lease agreement that would give the renter incentives to take good care of the apartment?
12. You are the CEO of a company and you are considering entering into an agreement to have your company buy another company. You think the price might be too high, but you will be the CEO of the combined, much larger company. You know that when the company gets bigger, your pay and prestige will increase. What is the nature of the agency conflict here and how is it related to ethical considerations?
13. Are hostile takeovers necessarily bad for firms or their investors? Explain.

The Stock Market

14. What is the difference between a public and a private corporation?
15. Describe the important changes that have occurred in stock markets over the last decade.
16. Explain why the bid-ask spread is a transaction cost.
17. Explain how the bid-ask spread is determined in most markets today.
18. The following quote on Yahoo! stock appeared on July 23, 2015, on Yahoo! Finance:



If you wanted to buy Yahoo!, what price would you pay? How much would you receive if you wanted to sell Yahoo!?

19. Suppose the following orders are received by an exchange for Cisco stock:

- Limit Order: Buy 200 shares at \$25
- Limit Order: Sell 200 shares at \$26
- Limit Order: Sell 100 shares at \$25.50
- Limit Order: Buy 100 shares at \$25.25

- a. What are the best bid and ask prices for Cisco stock?
- b. What is the current bid-ask spread for Cisco stock?
- c. Suppose a market order arrives to buy 200 shares of Cisco. What average price will the buyer pay?
- d. After the market order in (c) clears, what are the new best bid and ask prices, and what is the new bid-ask spread for Cisco?

Introduction to Financial Statement Analysis

CHAPTER

2

AS WE DISCUSSED IN CHAPTER 1, ONE OF THE GREAT ADVANTAGES of the corporate organizational form is that it places no restriction on who can own shares in the corporation. Anyone with money to invest is a potential investor. As a result, corporations are often widely held, with investors ranging from individuals who hold 100 shares to mutual funds and institutional investors who own millions of shares. For example, in 2012, International Business Machines Corporation (IBM) had about 980 million shares outstanding held by nearly 600,000 shareholders. Most shareholders were small. Warren Buffett's Berkshire Hathaway was the largest shareholder with about an 8% stake. Less than 1% of the company was owned by insiders (IBM executives).

Although the corporate organizational structure greatly facilitates the firm's access to investment capital, it also means that stock ownership is most investors' sole tie to the company. How, then, do investors learn enough about a company to know whether or not they should invest in it? How can financial managers assess the success of their own firm and compare it to the performance of competitors? One way firms evaluate their performance and communicate this information to investors is through their *financial statements*.

Firms issue financial statements regularly to communicate financial information to the investment community. A detailed description of the preparation and analysis of these statements is sufficiently complicated that to do it justice would require an entire book. Here, we briefly review the subject, emphasizing only the material that investors and corporate financial managers need in order to make the corporate-finance decisions we discuss in the text.

We review the four main types of financial statements, present examples of these statements for a firm, and discuss where an investor or manager might find various types of information about the company. We also discuss some of the financial ratios that investors and analysts use to assess a firm's performance and value. We close the chapter with a look at a few highly publicized financial reporting abuses.

2.1 Firms' Disclosure of Financial Information

Financial statements are accounting reports with past performance information that a firm issues periodically (usually quarterly and annually). U.S. public companies are required to file their financial statements with the U.S. Securities and Exchange Commission (SEC) on a quarterly basis on form **10-Q** and annually on form **10-K**. They must also send an **annual report** with their financial statements to their shareholders each year. Private companies often prepare financial statements as well, but they usually do not have to disclose these reports to the public. Financial statements are important tools through which investors, financial analysts, and other interested outside parties (such as creditors) obtain information about a corporation. They are also useful for managers within the firm as a source of information for corporate financial decisions. In this section, we examine the guidelines for preparing financial statements and introduce the types of financial statements.

Preparation of Financial Statements

Reports about a company's performance must be understandable and accurate. **Generally Accepted Accounting Principles (GAAP)** provide a common set of rules and a standard format for public companies to use when they prepare their reports. This standardization also makes it easier to compare the financial results of different firms.

Investors also need some assurance that the financial statements are prepared accurately. Corporations are required to hire a neutral third party, known as an **auditor**, to check the annual financial statements, to ensure that the annual financial statements are reliable and prepared according to GAAP.

International Financial Reporting Standards

Because Generally Accepted Accounting Principles (GAAP) differ among countries, companies operating internationally face tremendous accounting complexity. Investors also face difficulty interpreting financial statements of foreign companies, which is often considered a major barrier to international capital mobility. As companies and capital markets become more global, however, interest in harmonizing accounting standards across countries has increased.

The most important harmonization project began in 1973 when representatives of 10 countries (including the United States) established the International Accounting Standards Committee. This effort led to the creation of the International Accounting Standards Board (IASB) in 2001, with headquarters in London. Now the IASB has issued a set of International Financial Reporting Standards (IFRS).

The IFRS are taking root throughout the world. The European Union (EU) approved an accounting regulation in 2002 requiring all publicly traded EU companies to follow IFRS in their consolidated financial statements starting in 2005. As of 2012, over 120 jurisdictions either require or permit the use of IFRS, including the EU, Australia, Brazil, Canada, Russia, Hong Kong, Taiwan, and Singapore. China, India and Japan will soon follow suit. Indeed, currently all major stock exchanges around the world accept IFRS except the United States and Japan, which maintain their local GAAP.

The main difference between U.S. GAAP and IFRS is conceptual—U.S. GAAP are based primarily on accounting rules with specific guidance in applying them, whereas IFRS are based more on principles requiring professional judgment by accountants, and specific guidance in application is limited. Even so, some differences in rules also exist. For example, U.S. GAAP generally prohibit the upward revaluation of non-financial assets, whereas the IFRS allow the revaluation of some such assets to fair value. U.S. GAAP also rely more heavily on historical cost, as opposed to “fair value,” to estimate the value of assets and liabilities.

Effort to achieve convergence between U.S. GAAP and IFRS was spurred by the Sarbanes-Oxley Act of 2002. It included a provision that U.S. accounting standards move toward international convergence on high-quality accounting standards. Currently SEC regulations still require public U.S. firms to report using U.S. GAAP. That said, modifications to both IFRS and U.S. GAAP have brought the two closer together, with the key remaining differences in the areas of impairment charges, leasing, insurance, and the treatment of financial instruments. As of mid-2015, the SEC looks likely to allow U.S. companies to use IFRS to provide supplemental information, but it will still require them to file their financials in accordance with U.S. GAAP.

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QUESTION: *What best practices do you recommend for financial managers?*

ANSWER:

1. *Maintain a tight financial control environment with respect to accounting controls and process.* Incorporate a strategic approach to IT architecture to ensure data integrity, consistency, and process controls while reducing reliance on human, manual processes—a source of risk and errors.
2. *Ensure a robust budgeting and capital allocation process built on a strong Financial Planning & Analysis team that is well integrated into the business.* Push data transparency to business leaders. They are best positioned to make difficult trade-offs in the budgeting process, but often lack data granularity to make those choices (and to see the imperative).
3. *Culture matters.* A culture of honest, frank debate that challenges the status quo and avoids homogeneity of thought makes the job more fun and leads to better results. A broad range of experience, and even some “battle scars,” ensures the organization recognizes patterns to foresee emerging risks. In that regard, a diverse team with respect to gender, race, and socioeconomic background brings differentiated perspectives, contributing to effective risk management.
4. *Make tough calls early and, ideally, once.* Lead.

QUESTION: *How has the crisis shaped the role of the CFO, or your view of it?*

ANSWER: In financial services, it redefined the perception of a CFO. Beyond focusing on accounting and external reporting functions, the CFO is now also the firm's most senior global manager for guardianship and risk management. Guardianship includes accounting (the controller function) and overseeing a comprehensive approach to IT systems. Risk management requires identifying sources of vulnerability, stress testing, and planning against them. The

INTERVIEW WITH RUTH PORAT



CFO has become a trusted adviser to the CEO, board and business leaders, which includes budgeting, capital allocation, and sensitivity analyses. Finally, in certain industries the CFO is the point person with regulators.

QUESTION: *What key lessons did you take from the financial crisis? What advice would you give future CFOs?*

ANSWER: I have three key takeaways from the financial crisis, relevant in both good and bad markets as well as across industries:

1. *Understand your greatest sources of vulnerability and defend against them.* For financial services, liquidity (access to cash) was a weak spot. In that period, we often said, “Liquidity is oxygen for a financial system: without it, you choke.” Without sufficient liquidity, banks were forced into a negative cycle of selling assets to raise cash. As Morgan Stanley's CFO, I managed liquidity with the maxim that it was sacrosanct. We invested substantially in the amount and durability of the company's liquidity reserve. Similarly, regulators coming out of the crisis appropriately demanded higher capital, lower leverage, better liquidity, more durable funding, and rigorous stress testing, which imposed transparency on the banks and exposed their weaknesses.
2. *Build a robust control infrastructure ahead of needs, including financial and risk management controls, systems, and processes.* Just as one shouldn't drive a car at 100 mph with mud on the windshield, business leaders must have visibility about their business from accurate, insightful, and timely data consistent with strong financial controls. Rapid growth industries need to invest in infrastructure early because the business requirements continue to grow so rapidly.
3. *Recognize that time is your enemy.* Treasury Secretary Paulson told me during the financial crisis that you must have the will and the means to solve problems; too often, by the time you have the will, you no longer have the means. He was talking about policy, but that rule applies to any decision maker. The glaring examples, in retrospect, were the clear signs of crisis in August 2007 and the March 2008 collapse of Bear Stearns, but reactions were slow or nonexistent. Even in good times, business leaders must focus on resource optimization to maximize the potential for highest returns on investment.

Types of Financial Statements

Every public company is required to produce four financial statements: the *balance sheet*, the *income statement*, the *statement of cash flows*, and the *statement of stockholders' equity*. These financial statements provide investors and creditors with an overview of the firm's financial performance. In the sections that follow, we take a close look at the content of these financial statements.

CONCEPT CHECK

1. What are the four financial statements that all public companies must produce?
2. What is the role of an auditor?

2.2 The Balance Sheet

The **balance sheet**, or **statement of financial position**,¹ lists the firm's *assets* and *liabilities*, providing a snapshot of the firm's financial position at a given point in time. Table 2.1 shows the balance sheet for a fictitious company, Global Conglomerate Corporation. Notice that the balance sheet is divided into two parts ("sides"), with the assets on the left side and the liabilities on the right. The **assets** list the cash, inventory, property, plant, and equipment, and other investments the company has made; the **liabilities** show the firm's obligations to creditors. Also shown with liabilities on the right side of the balance sheet is

TABLE 2.1

Global Conglomerate Corporation Balance Sheet

GLOBAL CONGLOMERATE CORPORATION					
Consolidated Balance Sheet					
Year Ended December 31 (in \$ million)					
Assets	2015	2014	Liabilities and Stockholders' Equity	2015	2014
Current Assets			Current Liabilities		
Cash	21.2	19.5	Accounts payable	29.2	24.5
Accounts receivable	18.5	13.2	Notes payable/short-term debt	3.5	3.2
Inventories	15.3	14.3	Current maturities of long-term debt	13.3	12.3
Other current assets	2.0	1.0	Other current liabilities	2.0	4.0
Total current assets	57.0	48.0	Total current liabilities	48.0	44.0
Long-Term Assets			Long-Term Liabilities		
Land	22.2	20.7	Long-term debt	99.9	76.3
Buildings	36.5	30.5	Capital lease obligations	—	—
Equipment	39.7	33.2	Total debt	99.9	76.3
Less accumulated depreciation	(18.7)	(17.5)	Deferred taxes	7.6	7.4
Net property, plant, and equipment	79.7	66.9	Other long-term liabilities	—	—
Goodwill and intangible assets	20.0	20.0	Total long-term liabilities	107.5	83.7
Other long-term assets	21.0	14.0	Total Liabilities	155.5	127.7
Total long-term assets	120.7	100.9	Stockholders' Equity	22.2	21.2
Total Assets	177.7	148.9	Total Liabilities and Stockholders' Equity	177.7	148.9

¹In IFRS and recent U.S. GAAP pronouncements, the balance sheet is referred to as the *statement of financial position*.

the *stockholders' equity*. **Stockholders' equity**, the difference between the firm's assets and liabilities, is an accounting measure of the firm's net worth.

The assets on the left side show how the firm uses its capital (its investments), and the right side summarizes the sources of capital, or how a firm raises the money it needs. Because of the way stockholders' equity is calculated, the left and right sides must balance:

The Balance Sheet Identity

$$\text{Assets} = \text{Liabilities} + \text{Stockholders' Equity} \quad (2.1)$$

In Table 2.1, total assets for 2015 (\$177.7 million) are equal to total liabilities (\$155.5 million) plus stockholders' equity (\$22.2 million).

Let's examine Global's assets, liabilities, and stockholders' equity in more detail.

Assets

In Table 2.1, Global's assets are divided into current and long-term assets. We discuss each in turn.

Current Assets. **Current assets** are either cash or assets that could be converted into cash within one year. This category includes the following:

1. Cash and other **marketable securities**, which are short-term, low-risk investments that can be easily sold and converted to cash (such as money market investments like government debt that matures within a year);
2. **Accounts receivable**, which are amounts owed to the firm by customers who have purchased goods or services on credit;
3. **Inventories**, which are composed of raw materials as well as work-in-progress and finished goods;
4. Other current assets, which is a catch-all category that includes items such as pre-paid expenses (such as rent or insurance paid in advance).

Long-Term Assets. The first category of **long-term assets** is net property, plant, and equipment. These include assets such as real estate or machinery that produce tangible benefits for more than one year. If Global spends \$2 million on new equipment, this \$2 million will be included with property, plant, and equipment on the balance sheet. Because equipment tends to wear out or become obsolete over time, Global will reduce the value recorded for this equipment each year by deducting a **depreciation expense**. An asset's **accumulated depreciation** is the total amount deducted over its life. The firm reduces the value of fixed assets (other than land) over time according to a depreciation schedule that depends on the asset's life span. Depreciation is not an actual cash expense that the firm pays; it is a way of recognizing that buildings and equipment wear out and thus become less valuable the older they get. The **book value** of an asset, which is the value shown in the firm's financial statements, is equal to its acquisition cost less accumulated depreciation. Net property, plant, and equipment shows the book value of these assets.

When a firm acquires another company, it will acquire a set of tangible assets (such as inventory or property, plant, and equipment) that will then be included on its balance sheet. In many cases, however, the firm may pay more for the company than the total book value of the assets it acquires. In this case, the difference between the price paid for the company and the book value assigned to its tangible assets is recorded separately as **goodwill** and **intangible assets**. For example, Global paid \$25 million in 2013 for a firm whose tangible assets had a book value of \$5 million. The remaining \$20 million appears

as goodwill and intangible assets in Table 2.1. This entry in the balance sheet captures the value of other “intangibles” that the firm acquired through the acquisition (e.g., brand names and trademarks, patents, customer relationships, and employees). If the firm assesses that the value of these intangible assets declined over time, it will reduce the amount listed on the balance sheet by an **amortization** or **impairment charge** that captures the change in value of the acquired assets. Like depreciation, amortization is not an actual cash expense.

Other long-term assets can include such items as property not used in business operations, start-up costs in connection with a new business, investments in long-term securities, and property held for sale. The sum of all the firms’ assets is the total assets at the bottom of the left side of the balance sheet in Table 2.1.

Liabilities

We now examine the liabilities shown on the right side of the balance sheet, which are divided into *current* and *long-term liabilities*.

Current Liabilities. Liabilities that will be satisfied within one year are known as **current liabilities**. They include the following:

1. **Accounts payable**, the amounts owed to suppliers for products or services purchased with credit;
2. **Short-term debt** or notes payable, and current maturities of *long-term debt*, which are all repayments of debt that will occur within the next year;
3. Items such as salary or taxes that are owed but have not yet been paid, and deferred or unearned revenue, which is revenue that has been received for products that have not yet been delivered.

The difference between current assets and current liabilities is the firm’s **net working capital**, the capital available in the short term to run the business. For example, in 2015, Global’s net working capital totaled \$9 million (\$57 million in current assets – \$48 million in current liabilities). Firms with low (or negative) net working capital may face a shortage of funds unless they generate sufficient cash from their ongoing activities.

Long-Term Liabilities. **Long-term liabilities** are liabilities that extend beyond one year. We describe the main types as follows:

1. **Long-term debt** is any loan or debt obligation with a maturity of more than a year. When a firm needs to raise funds to purchase an asset or make an investment, it may borrow those funds through a long-term loan.
2. **Capital leases** are long-term lease contracts that obligate the firm to make regular lease payments in exchange for use of an asset.² They allow a firm to gain use of an asset by leasing it from the asset’s owner. For example, a firm may lease a building to serve as its corporate headquarters.
3. **Deferred taxes** are taxes that are owed but have not yet been paid. Firms generally keep two sets of financial statements: one for financial reporting and one for tax purposes. Occasionally, the rules for the two types of statements differ. Deferred tax liabilities generally arise when the firm’s financial income exceeds its income for tax purposes. Because deferred taxes will eventually be paid, they appear as a liability on the balance sheet.³

²See Chapter 25 for a precise definition of a capital lease.

³A firm may also have deferred tax assets related to tax credits it has earned that it will receive in the future.

Stockholders' Equity

The sum of the current liabilities and long-term liabilities is total liabilities. The difference between the firm's assets and liabilities is the stockholders' equity; it is also called the **book value of equity**. As we stated earlier, it is an accounting measure of the net worth of the firm.

Ideally, the balance sheet would provide us with an accurate assessment of the true value of the firm's equity. Unfortunately, this is unlikely to be the case. First, many of the assets listed on the balance sheet are valued based on their historical cost rather than their true value today. For example, an office building is listed on the balance sheet according to its historical cost net of depreciation. But the actual value of the office building today may be very different (and possibly much *more*) than the amount the firm paid for it years ago. The same is true for other property, plant, and equipment, as well as goodwill: The true value today of an asset may be very different from, and even exceed, its book value. A second, and probably more important, problem is that *many of the firm's valuable assets are not captured on the balance sheet*. Consider, for example, the expertise of the firm's employees, the firm's reputation in the marketplace, the relationships with customers and suppliers, the value of future research and development innovations, and the quality of the management team. These are all assets that add to the value of the firm that do not appear on the balance sheet.

Market Value Versus Book Value

For the reasons cited above, the book value of equity, while accurate from an accounting perspective, is an inaccurate assessment of the true value of the firm's equity. Successful firms are often able to borrow in excess of the book value of their assets because creditors recognize that the market value of the assets is far higher than the book value. Thus, it is not surprising that the book value of equity will often differ substantially from the amount investors are willing to pay for the equity. The total *market* value of a firm's equity equals the number of shares outstanding times the firm's market price per share:

$$\text{Market Value of Equity} = \text{Shares outstanding} \times \text{Market price per share} \quad (2.2)$$

The market value of equity is often referred to as the company's **market capitalization** (or "market cap"). The market value of a stock does not depend on the historical cost of the firm's assets; instead, it depends on what investors expect those assets to produce in the future.

EXAMPLE 2.1

Market Versus Book Value

Problem

If Global has 3.6 million shares outstanding, and these shares are trading for a price of \$14 per share, what is Global's market capitalization? How does the market capitalization compare to Global's book value of equity in 2015?

Solution

Global's market capitalization is $(3.6 \text{ million shares}) \times (\$14/\text{share}) = \$50.4 \text{ million}$. This market capitalization is significantly higher than Global's book value of equity of \$22.2 million. Thus, investors are willing to pay $50.4/22.2 = 2.27$ times the amount Global's shares are "worth" according to their book value.

Market-to-Book Ratio. In Example 2.1, we computed the **market-to-book ratio** (also called the **price-to-book [P/B] ratio**) for Global, which is the ratio of its market capitalization to the book value of stockholders' equity.

$$\text{Market-to-Book Ratio} = \frac{\text{Market Value of Equity}}{\text{Book Value of Equity}} \quad (2.3)$$

The market-to-book ratio for most successful firms substantially exceeds 1, indicating that the value of the firm's assets when put to use exceeds their historical cost. Variations in this ratio reflect differences in fundamental firm characteristics as well as the value added by management.

In Fall 2015, Citigroup (C) had a market-to-book ratio of 0.76, a reflection of investors' assessment that many of Citigroup's assets (such as some mortgage securities) were worth far less than their book value. At the same time, the average market-to-book ratio for major U.S. banks and financial firms was 1.9, and for all large U.S. firms it was 2.9. In contrast, Pepsico (PEP) had a market-to-book ratio of 8.3, and IBM had a market-to-book ratio of 11.3. Analysts often classify firms with low market-to-book ratios as **value stocks**, and those with high market-to-book ratios as **growth stocks**.

Enterprise Value

A firm's market capitalization measures the market value of the firm's equity, or the value that remains after the firm has paid its debts. But what is the value of the business itself? The **enterprise value** of a firm (also called the **total enterprise value** or **TEV**) assesses the value of the underlying business assets, unencumbered by debt and separate from any cash and marketable securities. We compute it as follows:

$$\text{Enterprise Value} = \text{Market Value of Equity} + \text{Debt} - \text{Cash} \quad (2.4)$$

From Example 2.1, Global's market capitalization in 2015 is \$50.4 million. Its debt is \$116.7 million (\$3.5 million of notes payable, \$13.3 million of current maturities of long-term debt, and remaining long-term debt of \$99.9 million). Therefore, given its cash balance of \$21.2 million, Global's enterprise value is $50.4 + 116.7 - 21.2 = \$145.9$ million. The enterprise value can be interpreted as the cost to take over the business. That is, it would cost $50.4 + 116.7 = \$167.1$ million to buy all of Global's equity and pay off its debts, but because we would acquire Global's \$21.2 million in cash, the net cost of the business is only $167.1 - 21.2 = \$145.9$ million.

CONCEPT CHECK

1. What is the balance sheet identity?
2. The book value of a company's assets usually does not equal the market value of those assets. What are some reasons for this difference?
3. What is a firm's enterprise value, and what does it measure?

2.3 The Income Statement

When you want somebody to get to the point, you might ask him or her for the "bottom line." This expression comes from the *income statement*. The **income statement** or **statement of financial performance**⁴ lists the firm's revenues and expenses over a period of time. The last or "bottom" line of the income statement shows the firm's **net income**, which is a measure of its profitability during the period. The income statement is sometimes called a profit and loss, or "P&L" statement, and the net income is also referred to as the firm's **earnings**. In this section, we examine the components of the income statement in detail and introduce ratios we can use to analyze this data.

⁴In IFRS and recent U.S. GAAP pronouncements, the income statement is referred to as the *statement of financial performance*.

Earnings Calculations

Whereas the balance sheet shows the firm's assets and liabilities at a given point in time, the income statement shows the flow of revenues and expenses generated by those assets and liabilities between two dates. Table 2.2 shows Global's income statement for 2015. We examine each category on the statement.

Gross Profit. The first two lines of the income statement list the revenues from sales of products and the costs incurred to make and sell the products. Cost of sales shows costs directly related to producing the goods or services being sold, such as manufacturing costs. Other costs such as administrative expenses, research and development, and interest expenses are not included in the cost of sales. The third line is **gross profit**, which is the difference between sales revenues and the costs.

Operating Expenses. The next group of items is operating expenses. These are expenses from the ordinary course of running the business that are not directly related to producing the goods or services being sold. They include administrative expenses and overhead, salaries, marketing costs, and research and development expenses. The third type of operating expense, depreciation and amortization, is not an actual cash expense but represents an estimate of the costs that arise from wear and tear or obsolescence of the firm's assets.⁵ The firm's gross profit net of operating expenses is called **operating income**.

TABLE 2.2

Global Conglomerate Corporation Income Statement Sheet

GLOBAL CONGLOMERATE CORPORATION		
Income Statement		
Year Ended December 31 (in \$ million)		
	2015	2014
Total sales	186.7	176.1
Cost of sales	(153.4)	(147.3)
Gross Profit	33.3	28.8
Selling, general, and administrative expenses	(13.5)	(13.0)
Research and development	(8.2)	(7.6)
Depreciation and amortization	(1.2)	(1.1)
Operating Income	10.4	7.1
Other income	—	—
Earnings Before Interest and Taxes (EBIT)	10.4	7.1
Interest income (expense)	(7.7)	(4.6)
Pretax Income	2.7	2.5
Taxes	(0.7)	(0.6)
Net Income	2.0	1.9
Earnings per share:	\$0.556	\$0.528
Diluted earnings per share:	\$0.526	\$0.500

⁵Only certain types of amortization are deductible as a pretax expense (e.g., amortization of the cost of an acquired patent). Also, firms often do not separately list depreciation and amortization on the income statement, but rather include them with the expenses by function (e.g., depreciation of R&D equipment would be included with R&D expenses). When depreciation and amortization has been separated in this way, practitioners often refer to the expense items as “clean” (e.g., “clean R&D” is R&D expenses excluding any depreciation or amortization).

Earnings before Interest and Taxes. We next include other sources of income or expenses that arise from activities that are not the central part of a company's business. Income from the firm's financial investments is one example of other income that would be listed here. After we have adjusted for other sources of income or expenses, we have the firm's earnings before interest and taxes, or **EBIT**.

Pretax and Net Income. From EBIT, we deduct the interest expense related to outstanding debt to compute Global's pretax income, and then we deduct corporate taxes to determine the firm's net income.

Net income represents the total earnings of the firm's equity holders. It is often reported on a per-share basis as the firm's **earnings per share (EPS)**, which we compute by dividing net income by the total number of shares outstanding:

$$\text{EPS} = \frac{\text{Net Income}}{\text{Shares Outstanding}} = \frac{\$2.0 \text{ Million}}{3.6 \text{ Million Shares}} = \$0.556 \text{ per Share} \quad (2.5)$$

Although Global has only 3.6 million shares outstanding as of the end of 2015, the number of shares outstanding may grow if Global compensates its employees or executives with **stock options** that give the holder the right to buy a certain number of shares by a specific date at a specific price. If the options are "exercised," the company issues new stock and the number of shares outstanding will grow. The number of shares may also grow if the firm issues **convertible bonds**, a form of debt that can be converted to shares. Because there will be more total shares to divide the same earnings, this growth in the number of shares is referred to as **dilution**. Firms disclose the potential for dilution by reporting **diluted EPS**, which represents earnings per share for the company calculated as though, for example, in-the-money stock options or other stock-based compensation had been exercised or dilutive convertible debt had been converted. For example, in 2014, Global awarded 200,000 shares of restricted stock to its key executives. While these are currently unvested, they will ultimately increase the number of shares outstanding, so Global's diluted EPS is \$2 million/3.8 million shares = \$0.526.⁶

CONCEPT CHECK

1. What is the difference between a firm's gross profit and its net income?
2. What is the diluted earnings per share?

2.4 The Statement of Cash Flows

The income statement provides a measure of the firm's profit over a given time period. However, it does not indicate the amount of *cash* the firm has generated. There are two reasons that net income does not correspond to cash earned. First, there are non-cash entries on the income statement, such as depreciation and amortization. Second, certain uses of cash, such as the purchase of a building or expenditures on inventory, are not reported on the income statement. The firm's **statement of cash flows** utilizes the information

⁶In the case of stock options, the diluted share count is typically calculated using the *treasury stock method*, in which the number of shares added has the same value as the profit from exercising the option. For example, given Global's share price of \$14 per share, an option giving an employee the right to purchase a share for \$7 would add $(\$14 - \$7)/\$14 = 0.5$ shares to the diluted share count.

from the income statement and balance sheet to determine how much cash the firm has generated, and how that cash has been allocated, during a set period. As we will see, from the perspective of an investor attempting to value the firm, the statement of cash flows provides what may be the most important information of the four financial statements.

The statement of cash flows is divided into three sections: operating activities, investment activities, and financing activities. The first section, operating activity, starts with net income from the income statement. It then adjusts this number by adding back all non-cash entries related to the firm's operating activities. The next section, investment activity, lists the cash used for investment. The third section, financing activity, shows the flow of cash between the firm and its investors. Global Conglomerate's statement of cash flows is shown in Table 2.3. In this section, we take a close look at each component of the statement of cash flows.

Operating Activity

The first section of Global's statement of cash flows adjusts net income by all non-cash items related to operating activity. For instance, depreciation is deducted when computing net income, but it is not an actual cash outflow. Thus, we add it back to net income when determining the amount of cash the firm has generated. Similarly, we add back any other non-cash expenses (for example, deferred taxes or expenses related to stock-based compensation).

TABLE 2.3

Global Conglomerate Corporation Statement of Cash Flows

GLOBAL CONGLOMERATE CORPORATION		
Statement of Cash Flows		
Year Ended December 31 (in \$ million)		
	2015	2014
Operating activities		
Net income	2.0	1.9
Depreciation and amortization	1.2	1.1
Other non-cash items	(2.8)	(1.0)
Cash effect of changes in		
Accounts receivable	(5.3)	(0.3)
Accounts payable	4.7	(0.5)
Inventory	(1.0)	(1.0)
Cash from operating activities	(1.2)	0.2
Investment activities		
Capital expenditures	(14.0)	(4.0)
Acquisitions and other investing activity	(7.0)	(2.0)
Cash from investing activities	(21.0)	(6.0)
Financing activities		
Dividends paid	(1.0)	(1.0)
Sale (or purchase) of stock	—	—
Increase in borrowing	24.9	5.5
Cash from financing activities	23.9	4.5
Change in cash and cash equivalents	1.7	(1.3)

Next, we adjust for changes to net working capital that arise from changes to accounts receivable, accounts payable, or inventory. When a firm sells a product, it records the revenue as income even though it may not receive the cash from that sale immediately. Instead, it may grant the customer credit and let the customer pay in the future. The customer's obligation adds to the firm's accounts receivable. We use the following guidelines to adjust for changes in working capital:

1. *Accounts Receivable*: When a sale is recorded as part of net income, but the cash has not yet been received from the customer, we must adjust the cash flows by *deducting* the increases in accounts receivable. This increase represents additional lending by the firm to its customers, and it reduces the cash available to the firm.
2. *Accounts Payable*: Conversely, we *add* increases in accounts payable. Accounts payable represents borrowing by the firm from its suppliers. This borrowing increases the cash available to the firm.
3. *Inventory*: Finally, we *deduct* increases to inventory. Increases to inventory are not recorded as an expense and do not contribute to net income (the cost of the goods are only included in net income when the goods are actually sold). However, the cost of increasing inventory is a cash expense for the firm and must be deducted.

We can identify the changes in these working capital items from the balance sheet. For example, from Table 2.1, Global's accounts receivable increased from \$13.2 million in 2014 to \$18.5 million in 2015. We deduct the increase of $18.5 - 13.2 = \$5.3$ million on the statement of cash flows. Note that although Global showed positive net income on the income statement, it actually had a negative \$1.2 million cash flow from operating activity, in large part because of the increase in accounts receivable.

Investment Activity

The next section of the statement of cash flows shows the cash required for investment activities. Purchases of new property, plant, and equipment are referred to as **capital expenditures**. Recall that capital expenditures do not appear immediately as expenses on the income statement. Instead, firms recognize these expenditures over time as depreciation expenses. To determine the firm's cash flow, we already added back depreciation because it is not an actual cash outflow. Now, we subtract the actual capital expenditure that the firm made. Similarly, we also deduct other assets purchased or long-term investments made by the firm, such as acquisitions or purchases of marketable securities. In Table 2.3, we see that in 2015, Global spent \$21 million in cash on investing activities.

Financing Activity

The last section of the statement of cash flows shows the cash flows from financing activities. Dividends paid to shareholders are a cash outflow. Global paid \$1 million to its shareholders as dividends in 2015. The difference between a firm's net income and the amount it spends on dividends is referred to as the firm's **retained earnings** for that year:

$$\text{Retained Earnings} = \text{Net Income} - \text{Dividends} \quad (2.6)$$

Global retained $\$2 \text{ million} - \$1 \text{ million} = \$1 \text{ million}$, or 50% of its earnings in 2015.

Also listed under financing activity is any cash the company received from the sale of its own stock, or cash spent buying (repurchasing) its own stock. Global did not issue or repurchase stock during this period. The last items to include in this section result from

changes to Global's short-term and long-term borrowing. Global raised money by issuing debt, so the increases in borrowing represent cash inflows.

The final line of the statement of cash flows combines the cash flows from these three activities to calculate the overall change in the firm's cash balance over the period of the statement. In this case, Global had cash inflows of \$1.7 million, which matches the change in cash from 2014 to 2015 shown earlier in the balance sheet. By looking at the statement in Table 2.3 as a whole, we can determine that Global chose to borrow to cover the cost of its investment and operating activities. Although the firm's cash balance has increased, Global's negative operating cash flows and relatively high expenditures on investment activities might give investors some reasons for concern. If that pattern continues, Global will need to raise capital, by continuing to borrow or issuing equity, to remain in business.

EXAMPLE 2.2

The Impact of Depreciation on Cash Flow

Problem

Suppose Global had an additional \$1 million depreciation expense in 2015. If Global's tax rate on pretax income is 26%, what would be the impact of this expense on Global's earnings? How would it impact Global's cash balance at the end of the year?

Solution

Depreciation is an operating expense, so Global's operating income, EBIT, and pretax income would fall by \$1 million. This decrease in pretax income would reduce Global's tax bill by $26\% \times \$1 \text{ million} = \0.26 million . Therefore, net income would fall by $1 - 0.26 = \$0.74 \text{ million}$.

On the statement of cash flows, net income would fall by \$0.74 million, but we would add back the additional depreciation of \$1 million because it is not a cash expense. Thus, cash from operating activities would rise by $-0.74 + 1 = \$0.26 \text{ million}$. Thus, Global's cash balance at the end of the year would increase by \$0.26 million, the amount of the tax savings that resulted from the additional depreciation expense.

CONCEPT CHECK

1. Why does a firm's net income not correspond to cash generated?
2. What are the components of the statement of cash flows?

2.5 Other Financial Statement Information

The most important elements of a firm's financial statements are the balance sheet, income statement, and the statement of cash flows, which we have already discussed. Several other pieces of information contained in the financial statements warrant brief mention: the statement of stockholders' equity, the management discussion and analysis, and notes to the financial statements.

Statement of Stockholders' Equity

The **statement of stockholders' equity** breaks down the stockholders' equity computed on the balance sheet into the amount that came from issuing shares (par value plus paid-in capital) versus retained earnings. Because the book value of stockholders' equity is not a useful assessment of value for financial purposes, financial managers use the statement of stockholders' equity infrequently (so we will skip the computational details here). We can,

however, determine the change in stockholders' equity using information from the firm's other financial statements as follows:⁷

$$\begin{aligned}\text{Change in Stockholders' Equity} &= \text{Retained Earnings} + \text{Net sales of stock} \\ &= \text{Net Income} - \text{Dividends} + \\ &\quad \text{Sales of stock} - \text{Repurchases of stock} \quad (2.7)\end{aligned}$$

For example, because Global had no stock sales or repurchases, its stockholders' equity increased by the amount of its retained earnings, or \$1.0 million, in 2015. Note that this result matches the change in stockholders' equity shown earlier on Global's balance sheet.

Management Discussion and Analysis

The **management discussion and analysis (MD&A)** is a preface to the financial statements in which the company's management discusses the recent year (or quarter), providing a background on the company and any significant events that may have occurred. Management may also discuss the coming year, and outline goals, new projects, and future plans.

Management should also discuss any important risks that the firm faces or issues that may affect the firm's liquidity or resources. Management is also required to disclose any **off-balance sheet transactions**, which are transactions or arrangements that can have a material impact on the firm's future performance yet do not appear on the balance sheet. For example, if a firm has made guarantees that it will compensate a buyer for losses related to an asset purchased from the firm, these guarantees represent a potential future liability for the firm that must be disclosed as part of the MD&A.

Notes to the Financial Statements

In addition to the four financial statements, companies provide extensive notes with further details on the information provided in the statements. For example, the notes document important accounting assumptions that were used in preparing the statements. They often provide information specific to a firm's subsidiaries or its separate product lines. They show the details of the firm's stock-based compensation plans for employees and the different types of debt the firm has outstanding. Details of acquisitions, spin-offs, leases, taxes, debt repayment schedules, and risk management activities are also given. The information provided in the notes is often very important to interpret fully the firm's financial statements.

EXAMPLE 2.3

Sales by Product Category

Problem

In the Segment Results section of its financial statements, Hormel Foods Corp (HRL) reported the following sales revenues by reportable segment/product category (\$ million):

	2014	2013
Grocery Products	\$1,558	\$1,518
Refrigerated Foods	4,644	4,252
Jennie-O Turkey Store	1,672	1,602
Specialty Foods	907	932
International & Other	534	448

Which category showed the highest percentage growth? If Hormel has the same percentage growth by category from 2014 to 2015, what will its total revenues be in 2015?

⁷Sales of stock would also include any stock-based compensation.

Solution

The percentage growth in the sales of grocery products was $1558/1518 - 1 = 2.6\%$. Similarly, growth in Refrigerated Foods was 9.2%, Jennie-O Turkey Store was 4.4%, Specialty Foods was -2.7% , and International and Other categories were 19.2%. Thus, International and Other categories showed the highest growth.

If these growth rates continue for another year, sales of Grocery Products will be $1558 \times 1.026 = \$1598$ million, and the other categories will be \$5071 million, \$1746 million, \$883 million, and \$637 million, respectively, for total revenues of \$9.9 billion, a 6.7% increase over 2014.

CONCEPT CHECK

1. Where do off-balance sheet transactions appear in a firm's financial statements?
2. What information do the notes to financial statements provide?

2.6 Financial Statement Analysis

Investors often use accounting statements to evaluate a firm in one of two ways:

1. Compare the firm with itself by analyzing how the firm has changed over time.
2. Compare the firm to other similar firms using a common set of financial ratios.

In this section we will describe the most commonly used ratios—related to profitability, liquidity, working capital, interest coverage, leverage, valuation, and operating returns—and explain how each one is used in practice.

Profitability Ratios

The income statement provides very useful information regarding the profitability of a firm's business and how it relates to the value of the firm's shares. The **gross margin** of a firm is the ratio of gross profit to revenues (sales):

$$\text{Gross Margin} = \frac{\text{Gross Profit}}{\text{Sales}} \quad (2.8)$$

A firm's gross margin reflects its ability to sell a product for more than the cost of producing it. For example, in 2015, Global had gross margin of $33.3/186.7 = 17.8\%$.

Because there are additional expenses of operating a business beyond the direct costs of goods sold, another important profitability ratio is the **operating margin**, the ratio of operating income to revenues:

$$\text{Operating Margin} = \frac{\text{Operating Income}}{\text{Sales}} \quad (2.9)$$

The operating margin reveals how much a company earns before interest and taxes from each dollar of sales. In 2015, Global's operating margin was $10.4/186.7 = 5.57\%$, an increase from its 2014 operating margin of $7.1/176.1 = 4.03\%$. We can similarly compute a firm's **EBIT margin** = (EBIT/Sales).

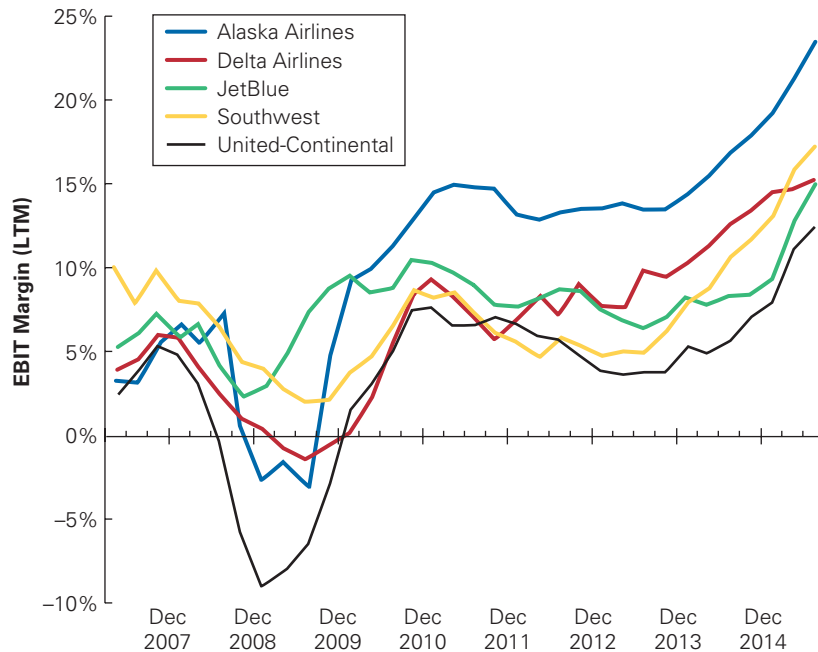
By comparing operating or EBIT margins across firms within an industry, we can assess the relative efficiency of the firms' operations. For example, Figure 2.1 compares the EBIT margins of five major U.S. airlines from 2007 to 2012. Notice the impact on profitability from the financial crisis during 2008–2009, as well as the consistently low profits of the largest and oldest of the carriers, United-Continental (UAL), relative to its competitors.

FIGURE 2.1

EBIT Margins for Five U.S. Airlines

Annual (last twelve month) EBIT margins for five U.S. airlines: Alaska Airlines, Delta Airlines, JetBlue, Southwest, and United-Continental. Note the decline in profitability for all airlines in the wake of the 2008 financial crisis, followed by a recovery by mid-2010. Note also the consistently lower profitability of the legacy carrier, United-Continental, relative to its younger peers.

Source: Capital IQ



In addition to the efficiency of operations, differences in operating margins can result from corporate strategy. For example, in 2014, high-end retailer Nordstrom (JWN) had an operating margin of 9.8%; Wal-Mart Stores (WMT, brand name Walmart) had an operating margin of only 5.6%. In this case, Walmart's lower operating margin was not a result of its inefficiency. Rather, the low operating margin is part of Walmart's strategy of offering low prices to sell common products in high volume. Indeed, Walmart's sales were nearly 36 times higher than those of Nordstrom.

Finally, a firm's **net profit margin** is the ratio of net income to revenues:

$$\text{Net Profit Margin} = \frac{\text{Net Income}}{\text{Sales}} \quad (2.10)$$

The net profit margin shows the fraction of each dollar in revenues that is available to equity holders after the firm pays interest and taxes. In 2015, Global's net profit margin was $2.0/186.7 = 1.07\%$. One must be cautious when comparing net profit margins: While differences in net profit margins can be due to differences in efficiency, they can also result from differences in leverage, which determines the amount of interest expense, as well as differences in accounting assumptions.

Liquidity Ratios

Financial analysts often use the information in the firm's balance sheet to assess its financial solvency or liquidity. Specifically, creditors often compare a firm's current assets and current

liabilities to assess whether the firm has sufficient working capital to meet its short-term needs. This comparison can be summarized in the firm's **current ratio**, the ratio of current assets to current liabilities:

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

Notice that Global's current ratio increased from $48/44 = 1.09$ in 2014 to $57/48 = 1.19$ in 2015.

A more stringent test of the firm's liquidity is the **quick ratio**, which compares only cash and "near cash" assets, such as short-term investments and accounts receivable, to current liabilities. In 2015, Global's quick ratio was $(21.2 + 18.5)/48 = 0.83$. A higher current or quick ratio implies less risk of the firm experiencing a cash shortfall in the near future. A reason to exclude inventory is that it may not be that liquid; indeed an increase in the current ratio that results from an unusual increase in inventory could be an indicator that the firm is having difficulty selling its products.

Ultimately, firms need cash to pay employees and meet other obligations. Running out of cash can be very costly for a firm, so firms often gauge their cash position by calculating the **cash ratio**, which is the most stringent liquidity ratio:

$$\text{Cash Ratio} = \frac{\text{Cash}}{\text{Current Liabilities}}$$

Of course, all of these liquidity ratios are limited in that they only consider the firm's current assets. If the firm is able to generate significant cash quickly from its ongoing activities, it might be highly liquid even if these ratios are poor.

EXAMPLE 2.4

Computing Liquidity Ratios

Problem

Calculate Global's quick ratio and cash ratio. Based on these measures, how has its liquidity changed between 2014 and 2015?

Solution

In 2014, Global's quick ratio was $(19.5 + 13.2)/44 = 0.74$ and its cash ratio was $19.5/44 = 0.44$. In 2015, these ratios were 0.83 and $21.2/48 = 0.44$, respectively. Thus, Global's cash ratio remained stable over this period, while its quick ratio improved slightly. But although these liquidity measures have not deteriorated, a more worrisome indicator for investors regarding Global's liquidity might be its ongoing negative cash flow from operating and investing activities, shown in the statement of cash flows.

Working Capital Ratios

We can use the combined information in the firm's income statement and balance sheet to gauge how efficiently the firm is utilizing its net working capital. To evaluate the speed at which a company turns sales into cash, firms often compute the number of

accounts receivable days—that is, the number of days' worth of sales accounts receivable represents:⁸

$$\text{Accounts Receivable Days} = \frac{\text{Accounts Receivable}}{\text{Average Daily Sales}} \quad (2.11)$$

Given average daily sales of $\$186.7 \text{ million} / 365 = \0.51 million in 2015, Global's receivables of $\$18.5 \text{ million}$ represent $18.5 / 0.51 = 36$ days' worth of sales. In other words, on average, Global takes a little over one month to collect payment from its customers. In 2014, Global's accounts receivable represented only 27 days' worth of sales. Although the number of receivable days can fluctuate seasonally, a significant unexplained increase could be a cause for concern (perhaps indicating the firm is doing a poor job of collecting from its customers or is trying to boost sales by offering generous credit terms).

There are similar ratios for accounts payable and inventory. For these items, it is natural to compare them to the firm's cost of sales, which should reflect the total amount paid to suppliers and inventory sold. Therefore, **accounts payable days** is defined as:

$$\text{Accounts Payable Days} = \frac{\text{Accounts Payable}}{\text{Average Daily Cost of Sales}} \quad (2.12)$$

Similarly, **inventory days** = (inventory/average daily cost of sales).⁹

Turnover ratios are an alternative way to measure working capital. We compute turnover ratios by expressing annual revenues or costs as a multiple of the corresponding working capital account. For example,

$$\text{Inventory Turnover} = \frac{\text{Annual Cost of Sales}}{\text{Inventory}} \quad (2.13)$$

Global's **inventory turnover** in 2015 is $153.4 / 15.3 = 10.0\times$, indicating that Global sold roughly 10 times its current stock of inventory during the year. Similarly, **accounts receivable turnover** = (annual sales/accounts receivable) and **accounts payable turnover** = (annual cost of sales/accounts payable). Note that higher turnover corresponds to shorter days, and thus a more efficient use of working capital.

While working capital ratios can be meaningfully compared over time or within an industry, there are wide differences across industries. While the average large U.S. firm had about 49 days' worth of receivables and 54 days' worth of inventory in 2015, airlines tend to have minimal accounts receivable or inventory, as their customers pay in advance and they sell a transportation service as opposed to a physical commodity. On the other hand, distillers and wine producers tend to have very large inventory (over 300 days on average), as their products are often aged prior to sale.

Interest Coverage Ratios

Lenders often assess a firm's ability to meet its interest obligations by comparing its earnings with its interest expenses using an **interest coverage ratio**. One common ratio to consider is the firm's EBIT as a multiple of its interest expenses. A high ratio indicates that the firm is earning much more than is necessary to meet its required interest payments.

⁸Accounts receivable days can also be calculated based on the *average* accounts receivable at the end of the current and prior year.

⁹As with accounts receivable days, these ratios can also be calculated using the average accounts payable or inventory balance from the current and prior year.

As a benchmark, creditors often look for an EBIT/Interest coverage ratio in excess of 5× for high-quality borrowers. When EBIT/Interest falls below 1.5, lenders may begin to question a company's ability to repay its debts.

Depreciation and amortization expenses are deducted when computing EBIT, but they are not actually cash expenses for the firm. Consequently, financial analysts often compute a firm's earnings before interest, taxes, depreciation, and amortization, or **EBITDA**, as a measure of the cash a firm generates from its operations and has available to make interest payments:¹⁰

$$\text{EBITDA} = \text{EBIT} + \text{Depreciation and Amortization} \quad (2.14)$$

We can similarly compute the firm's EBITDA/Interest coverage ratio.

EXAMPLE 2.5

Computing Interest Coverage Ratios

Problem

Assess Global's ability to meet its interest obligations by calculating interest coverage ratios using both EBIT and EBITDA.

Solution

In 2014 and 2015, Global had the following interest coverage ratios:

$$\begin{aligned} 2014: \quad \frac{\text{EBIT}}{\text{Interest}} &= \frac{7.1}{4.6} = 1.54 \quad \text{and} \quad \frac{\text{EBITDA}}{\text{Interest}} = \frac{7.1 + 1.1}{4.6} = 1.78 \\ 2015: \quad \frac{\text{EBIT}}{\text{Interest}} &= \frac{10.4}{7.7} = 1.35 \quad \text{and} \quad \frac{\text{EBITDA}}{\text{Interest}} = \frac{10.4 + 1.2}{7.7} = 1.51 \end{aligned}$$

In this case Global's low—and declining—interest coverage could be a source of concern for its creditors.

Leverage Ratios

An important piece of information that we can learn from a firm's balance sheet is the firm's **leverage**, or the extent to which it relies on debt as a source of financing. The **debt-equity ratio** is a common ratio used to assess a firm's leverage. We calculate this ratio by dividing the total amount of short- and long-term debt (including current maturities) by the total stockholders' equity:

$$\text{Debt-Equity Ratio} = \frac{\text{Total Debt}}{\text{Total Equity}} \quad (2.15)$$

We can calculate the debt-equity ratio using either book or market values for equity and debt. From Table 2.1, Global's debt in 2015 includes notes payable (\$3.5 million), current

¹⁰Because firms often do not separately list depreciation and amortization expenses on the income statement, EBITDA is generally calculated by combining EBIT from the income statement and depreciation and amortization from the statement of cash flows. Note also that because the firm may ultimately need to invest to replace depreciating assets, EBITDA is best viewed as a measure of the firm's *short-run* ability to meet interest payments.

maturities of long-term debt (\$13.3 million), and long-term debt (\$99.9 million), for a total of \$116.7 million. Therefore, its *book* debt-equity ratio is $116.7/22.2 = 5.3$, using the book value of equity. Note the increase from 2014, when the book debt-equity ratio was only $(3.2 + 12.3 + 76.3)/21.2 = 91.8/21.2 = 4.3$.

Because of the difficulty interpreting the book value of equity, the book debt-equity ratio is not especially useful. Indeed, the book value of equity might even be negative, making the ratio meaningless. For example, Domino's Pizza (DPZ) has, based on the strength of its cash flow, consistently borrowed in excess of the book value of its assets. In 2014, it had debt of \$1.8 billion, with a total book value of assets of only \$600 million and an equity book value of $-\$1.2$ billion!

It is therefore most informative to compare the firm's debt to the market value of its equity. Recall from Example 2.1 that in 2015, the total market value of Global's equity, its market capitalization, is $3.6 \text{ million shares} \times \$14/\text{share} = \$50.4 \text{ million}$. Therefore, Global's *market* debt-equity ratio in 2015 is $116.7/50.4 = 2.3$, which means Global's debt is a bit more than double the market value of its equity.¹¹ As we show later in the text, a firm's market debt-equity ratio has important consequences for the risk and return of its stock.

We can also calculate the fraction of the firm financed by debt in terms of its **debt-to-capital ratio**:

$$\text{Debt-to-Capital Ratio} = \frac{\text{Total Debt}}{\text{Total Equity} + \text{Total Debt}} \quad (2.16)$$

Again, this ratio can be computed using book or market values.

While leverage increases the risk to the firm's equity holders, firms may also hold cash reserves in order to reduce risk. Thus, another useful measure to consider is the firm's **net debt**, or debt in excess of its cash reserves:

$$\text{Net Debt} = \text{Total Debt} - \text{Excess Cash \& Short-term Investments} \quad (2.17)$$

To understand why net debt may be a more relevant measure of leverage, consider a firm with more cash than debt outstanding: Because such a firm could pay off its debts immediately using its available cash, it has not increased its risk and has no effective leverage.

Analogous to the debt-to-capital ratio, we can use the concept of net debt to compute the firm's **debt-to-enterprise value ratio**:

$$\begin{aligned} \text{Debt-to-Enterprise Value Ratio} &= \frac{\text{Net Debt}}{\text{Market Value of Equity} + \text{Net Debt}} \\ &= \frac{\text{Net Debt}}{\text{Enterprise Value}} \end{aligned} \quad (2.18)$$

Given Global's 2015 cash balance of \$21.2 million, and total long- and short-term debt of \$116.7 million, its net debt is $116.7 - 21.2 = \$95.5 \text{ million}$.¹² Given its market value of equity of \$50.4 million, Global's enterprise value in 2015 is $50.4 + 95.5 = \$145.9 \text{ million}$,

¹¹In this calculation, we have compared the market value of equity to the book value of debt. Strictly speaking, it would be best to use the market value of debt. But because the market value of debt is generally not very different from its book value, this distinction is often ignored in practice.

¹²While net debt should ideally be calculated by deducting cash in excess of the firm's operating needs, absent additional information, it is typical in practice to deduct all cash on the balance sheet.

and thus its debt-to-enterprise value ratio is $95.5/145.9 = 65.5\%$. That is, 65.5% of Global's underlying business activity is financed via debt.

A final measure of leverage is a firm's **equity multiplier**, measured in book value terms as Total Assets/Book Value of Equity. As we will see shortly, this measure captures the amplification of the firm's accounting returns that results from leverage. The market value equity multiplier, which is generally measured as Enterprise Value/Market Value of Equity, indicates the amplification of shareholders' financial risk that results from leverage.

Valuation Ratios

Analysts use a number of ratios to gauge the market value of the firm. The most common is the firm's **price-earnings ratio (P/E)**:

$$\text{P/E Ratio} = \frac{\text{Market Capitalization}}{\text{Net Income}} = \frac{\text{Share Price}}{\text{Earnings per Share}} \quad (2.19)$$

That is, the P/E ratio is the ratio of the value of equity to the firm's earnings, either on a total basis or on a per-share basis. For example, Global's P/E ratio in 2015 was $50.4/2.0 = 14/0.556 = 25.2$. In other words, investors are willing to pay over 25 times Global's earnings to purchase a share.

The P/E ratio is a simple measure that is used to assess whether a stock is over- or under-valued based on the idea that the value of a stock should be proportional to the level of earnings it can generate for its shareholders. P/E ratios can vary widely across industries and tend to be highest for industries with high expected growth rates. For example, in late 2015, the median large U.S. firm had a P/E ratio of about 21. But software firms, which tend to have above-average growth rates, had an average P/E ratio of 38, while automotive firms, which have experienced slower growth since the recession, had an average P/E ratio of about 15. The risk of the firm will also affect this ratio—all else equal, riskier firms have lower P/E ratios.

Because the P/E ratio considers the value of the firm's equity, it is sensitive to the firm's choice of leverage. The P/E ratio is therefore of limited usefulness when comparing firms with markedly different leverage. We can avoid this limitation by instead assessing the market value of the underlying business using valuation ratios based on the firm's enterprise value. Common ratios include the ratio of enterprise value to revenue, or enterprise value to operating income, EBIT, or EBITDA. These ratios compare the value of the business to its sales, operating profits, or cash flow. Like the P/E ratio, these ratios are used to make intra-industry comparisons of how firms are priced in the market.

COMMON MISTAKE

Mismatched Ratios

When considering valuation (and other) ratios, be sure that the items you are comparing both represent amounts related to the entire firm or that both represent amounts related solely to equity holders. For example, a firm's share price and market capitalization are values associated with the firm's equity. Thus, it makes sense to compare them to the firm's earnings per share or net income, which are amounts to equity holders after

interest has been paid to debt holders. We must be careful, however, if we compare a firm's market capitalization to its revenues, operating income, or EBITDA because these amounts are related to the whole firm, and both debt and equity holders have a claim to them. Thus, it is better to compare revenues, operating income, or EBITDA to the enterprise value of the firm, which includes both debt and equity.

EXAMPLE 2.6**Computing Profitability and Valuation Ratios****Problem**

Consider the following data as of July 2015 for Walmart and Target Corporation (in \$ billion):

	Walmart (WMT)	Target (TGT)
Sales	485.7	73.1
EBIT	26.6	4.5
Depreciation and Amortization	9.2	2.1
Net Income	16.2	2.5
Market Capitalization	235.6	52.9
Cash	9.1	2.2
Debt	48.8	12.8

Compare Walmart's and Target's EBIT margins, net profit margins, P/E ratios, and the ratio of enterprise value to sales, EBIT, and EBITDA.

Solution

Walmart had an EBIT Margin of $26.6/485.7 = 5.5\%$, a net profit margin of $16.2/485.7 = 3.3\%$, and a P/E ratio of $235.6/16.2 = 14.5$. Its enterprise value was $235.6 + 48.8 - 9.1 = 275.3$ billion, which has a ratio of $275.3/485.7 = 0.57$ to sales, $275.3/26.6 = 10.3$ to EBIT, and $275.3/(26.6 + 9.2) = 7.7$ to EBITDA.

Target had an EBIT margin of $4.5/73.1 = 6.2\%$, a net profit margin of $2.5/73.1 = 3.4\%$, and a P/E ratio of $52.9/2.5 = 21.2$. Its enterprise value was $52.9 + 12.8 - 2.2 = \$63.5$ billion, which has a ratio of $63.5/73.1 = 0.87$ to sales, $63.5/4.5 = 14.1$ to EBIT, and $63.5/(4.5 + 2.1) = 9.6$ to EBITDA.

Note that despite the large difference in the size of the two firms, Target trades at higher, though comparable, multiples.

The P/E ratio, or ratios to EBIT or EBITDA, are not meaningful if the firm's earnings are negative. In this case, it is common to look at the firm's enterprise value relative to sales. The risk in doing so, however, is that earnings might be negative because the firm's underlying business model is fundamentally flawed, as was the case for many Internet firms in the late 1990s.

Operating Returns

Analysts often evaluate the firm's return on investment by comparing its income to its investment using ratios such as the firm's **return on equity (ROE)**:¹³

$$\text{Return on Equity} = \frac{\text{Net Income}}{\text{Book Value of Equity}} \quad (2.20)$$

Global's ROE in 2015 was $2.0/22.2 = 9.0\%$. The ROE provides a measure of the return that the firm has earned on its past investments. A high ROE may indicate the firm is able to find investment opportunities that are very profitable.

¹³Because net income is measured over the year, the ROE can also be calculated based on the average book value of equity at the end of the current and prior year.

Another common measure is **return on assets (ROA)**, which we calculate as:¹⁴

$$\text{Return on Assets} = \frac{\text{Net Income} + \text{Interest Expense}}{\text{Book Value of Assets}} \quad (2.21)$$

The ROA calculation includes interest expense in the numerator because the assets in the denominator have been funded by both debt and equity investors.

As a performance measure, ROA has the benefit that it is less sensitive to leverage than ROE. However, it is sensitive to working capital—for example, an equal increase in the firm's receivables and payables will increase total assets and thus lower ROA. To avoid this problem, we can consider the firm's **return on invested capital (ROIC)**:

$$\text{Return on Invested Capital} = \frac{\text{EBIT} (1 - \text{tax rate})}{\text{Book Value of Equity} + \text{Net Debt}} \quad (2.22)$$

The return on invested capital measures the after-tax profit generated by the business itself, excluding any interest expenses (or interest income), and compares it to the capital raised from equity and debt holders that has already been deployed (i.e., is not held as cash). Of the three measures of operating returns, ROIC is the most useful in assessing the performance of the underlying business.

EXAMPLE 2.7

Computing Operating Returns

Problem

Assess how Global's ability to use its assets effectively has changed in the last year by computing the change in its return on assets and return on invested capital.

Solution

In 2015, Global's ROA was $(2.0 + 7.7)/177.7 = 5.5\%$, compared to an ROA in 2014 of $(1.9 + 4.6)/148.9 = 4.4\%$.

To compute the return on invested capital, we need to calculate after-tax EBIT, which requires an estimate of Global's tax rate. Because $\text{Net income} = \text{Pretax income} \times (1 - \text{tax rate})$, we can estimate $(1 - \text{tax rate}) = \text{Net income}/\text{Pretax income}$. Thus, $\text{EBIT} \times (1 - \text{tax rate}) = 10.4 \times (2.0/2.7) = 7.7$ in 2015, and $7.1 \times (1.9/2.5) = 5.4$ in 2014.

To compute invested capital, note first that Global's net debt was $3.2 + 12.3 + 76.3 - 19.5 = 72.3$ in 2014 and $3.5 + 13.3 + 99.9 - 21.2 = 95.5$ in 2015. Thus, ROIC in 2015 was $7.7/(22.2 + 95.5) = 6.5\%$, compared with $5.4/(21.2 + 72.3) = 5.8\%$ in 2014.

The improvement in Global's ROA and ROIC from 2014 to 2015 suggests that Global was able to use its assets more effectively and increase its return over this period.

¹⁴ROA is sometimes calculated as $\text{Net Income}/\text{Assets}$, inappropriately ignoring the returns generated by the assets that are being used to support the firm's debt obligations (see also the box on Mismatched Ratios on page 75). Also, the interest expense that is added back is sometimes done on an after-tax basis in order to eliminate the benefit of the tax savings provided by debt. Finally, as with ROE, the *average* book value of assets at the beginning and end of the year may be used.

The DuPont Identity

We can gain further insight into a firm's ROE using a tool called the **DuPont Identity** (named for the company that popularized its use), which expresses the ROE in terms of the firm's profitability, asset efficiency, and leverage:

$$\text{ROE} = \underbrace{\left(\frac{\text{Net Income}}{\text{Sales}} \right)}_{\text{Net Profit Margin}} \times \underbrace{\left(\frac{\text{Sales}}{\text{Total Assets}} \right)}_{\text{Asset Turnover}} \times \underbrace{\left(\frac{\text{Total Assets}}{\text{Book Value of Equity}} \right)}_{\text{Equity Multiplier}} \quad (2.23)$$

The first term in the DuPont Identity is the firm's net profit margin, which measures its overall profitability. The second term is the firm's **asset turnover**, which measures how efficiently the firm is utilizing its assets to generate sales. Together, these terms determine the firm's return on assets. We compute ROE by multiplying by a measure of leverage called the equity multiplier, which indicates the value of assets held per dollar of shareholder equity. The greater the firm's reliance on debt financing, the higher the equity multiplier will be. Applying this identity to Global, we see that in 2015 its asset turnover is $186.7/177.7 = 1.05$, with an equity multiplier of $177.7/22.2 = 8$. Given its net profit margin of 1.07%, we can compute its ROE as

$$\text{ROE} = 9.0\% = 1.07\% \times 1.05 \times 8$$

EXAMPLE 2.8

Determinants of ROE

Problem

For the year ended January 2015, Walmart (WMT) had sales of \$485.7 billion, net income of \$16.2 billion, assets of \$203.7 billion, and a book value of equity of \$85.9 billion. For the same period, Target (TGT) had sales of \$73.1 billion, net income of \$2.5 billion, total assets of \$41.4 billion, and a book value of equity of \$14 billion. Compare these firms' profitability, asset turnover, equity multipliers, and return on equity during this period. If Target had been able to match Walmart's asset turnover during this period, what would its ROE have been?

Solution

Walmart's net profit margin (from Example 2.6) was $16.2/485.7 = 3.34\%$, which was just below Target's net profit margin of $2.5/73.1 = 3.42\%$. On the other hand, Walmart used its assets more efficiently, with an asset turnover of $485.7/203.7 = 2.38$, compared to only $73.1/41.4 = 1.77$ for Target. Finally, Target had greater leverage (in terms of book value), with an equity multiplier of $41.4/14 = 2.96$, relative to Walmart's equity multiplier of $203.7/85.9 = 2.37$. Next, let's compute the ROE of each firm directly, and using the DuPont Identity:

$$\text{Walmart ROE} = \frac{16.2}{85.9} = 18.8\% = 3.34\% \times 2.38 \times 2.37$$

$$\text{Target ROE} = \frac{2.5}{14} = 17.9\% = 3.42\% \times 1.77 \times 2.96$$

Note that due to its lower asset turnover, Target had a lower ROE than Walmart despite its higher net profit margin and leverage. If Target had been able to match Walmart's asset turnover, its ROE would have been significantly higher: $3.42\% \times 2.38 \times 2.96 = 24.1\%$.

To conclude our discussion of financial ratios, Table 2.4 presents the various measures of profitability, liquidity, working capital, interest coverage, leverage, valuation, and operating returns.

TABLE 2.4**Key Financial Ratios for Large U.S. Firms, Fall 2015**

(Data shows quartiles [25%, median, 75%] for U.S. stocks with market capitalization over \$1 billion)

Profitability Ratios		Leverage Ratios (continued)	
Gross Margin [28%, 42%, 65%]	$\frac{\text{Gross Profit}}{\text{Sales}}$	Debt-to-Capital Ratio [18%, 38%, 56%]	$\frac{\text{Total Debt}}{\text{Total Equity} + \text{Total Debt}}$
Operating Margin [7%, 13%, 22%]	$\frac{\text{Operating Income}}{\text{Sales}}$	Debt-to-Enterprise Value Ratio [−4%, 9%, 25%]	$\frac{\text{Net Debt}}{\text{Enterprise Value}}$
EBIT Margin [6%, 12%, 20%]	$\frac{\text{EBIT}}{\text{Sales}}$	Equity Multiplier (book) [1.7x, 2.5x, 4.0x]	$\frac{\text{Total Assets}}{\text{Book Value of Equity}}$
Net Profit Margin [2%, 7%, 14%]	$\frac{\text{Net Income}}{\text{Sales}}$	Equity Multiplier (market) [1.0x, 1.1x, 1.5x]	$\frac{\text{Enterprise Value}}{\text{Market Value of Equity}}$
Liquidity Ratios		Valuation Ratios	
Current Ratio [1.2x, 1.8x, 2.9x]	$\frac{\text{Current Assets}}{\text{Current Liabilities}}$	Market-to-Book Ratio [1.6x, 2.9x, 5.5x]	$\frac{\text{Market Value of Equity}}{\text{Book Value of Equity}}$
Quick Ratio [0.7x, 1.2x, 2.0x]	$\frac{\text{Cash \& Short-term Investments} + \text{Accounts Receivable}}{\text{Current Liabilities}}$	Price-Earnings Ratio [15.7x, 21.6x, 32.6x]	$\frac{\text{Share Price}}{\text{Earnings per Share}}$
Cash Ratio [0.1x, 0.4x, 0.8x]	$\frac{\text{Cash}}{\text{Current Liabilities}}$	Enterprise Value to Sales [1.3x, 2.4x, 4.3x]	$\frac{\text{Enterprise Value}}{\text{Sales}}$
Working Capital Ratios		Enterprise Value to EBIT [11.9x, 15.7x, 22.2x]	$\frac{\text{Enterprise Value}}{\text{EBIT}}$
Accounts Receivable Days [32, 49, 67]	$\frac{\text{Accounts Receivable}}{\text{Average Daily Sales}}$	Enterprise Value to EBITDA [8.8x, 11.5x, 15.4x]	$\frac{\text{Enterprise Value}}{\text{EBITDA}}$
Accounts Payable Days [25, 42, 62]	$\frac{\text{Accounts Payable}}{\text{Average Daily Cost of Sales}}$	Operating Returns	
Inventory Days [24, 54, 92]	$\frac{\text{Inventory}}{\text{Average Daily Cost of Sales}}$	Asset Turnover [0.3x, 0.6x, 1.1x]	$\frac{\text{Sales}}{\text{Total Assets}}$
Interest Coverage Ratios		Return on Equity (ROE) [4%, 11%, 19%]	$\frac{\text{Net Income}}{\text{Book Value of Equity}}$
EBIT/Interest Coverage [2.9x, 6.7x, 15.8x]	$\frac{\text{EBIT}}{\text{Interest Expense}}$	Return on Assets (ROA) [−1%, 3%, 8%]	$\frac{\text{Net Income} + \text{Interest Expense}}{\text{Book Value of Assets}}$
EBITDA/Interest Coverage [5.2x, 9.8x, 20.2x]	$\frac{\text{EBITDA}}{\text{Interest Expense}}$	Return on Invested Capital (ROIC) [7%, 12%, 21%]	$\frac{\text{EBIT} (1 - \text{Tax Rate})}{\text{Book Value of Equity} + \text{Net Deb}}$
Leverage Ratios			
Debt-Equity Ratio (book) [21%, 60%, 121%]	$\frac{\text{Total Debt}}{\text{Book Value of Equity}}$		
Debt-Equity Ratio (market) [6%, 21%, 51%]	$\frac{\text{Total Debt}}{\text{Market Value of Equity}}$		

CONCEPT CHECK

1. Why is EBITDA used to assess a firm's ability to meet its interest obligations?
2. What is the difference between a firm's book debt-equity ratio and its market debt-equity ratio?
3. To compare the valuations of firms with very different leverage, which valuation multiples would be most appropriate?
4. What is the DuPont Identity?

2.7 Financial Reporting in Practice

The various financial statements we have examined are of critical importance to investors and financial managers alike. Even with safeguards such as GAAP and auditors, though, financial reporting abuses unfortunately do take place. We now review two of the most infamous examples.

Enron

Enron was the most well known of the accounting scandals of the early 2000s. Enron started as an operator of natural-gas pipelines but evolved into a global trader dealing in a range of products including gas, oil, electricity, and even broadband Internet capacity. A series of events unfolded that, in December 2001, led Enron to file what was, at the time, the largest bankruptcy filing in U.S. history. By the end of that year, the market value of Enron's shares had fallen by over \$60 billion.

Interestingly, throughout the 1990s and up to late 2001, Enron was touted as one of the most successful and profitable companies in America. *Fortune* rated Enron "The Most Innovative Company in America" for six straight years, from 1995 to 2000. But while many aspects of Enron's business were successful, subsequent investigations suggest that Enron executives had been manipulating Enron's financial statements to mislead investors and artificially inflate the price of Enron's stock and maintain its credit rating. In 2000, for example, 96% of Enron's reported earnings were the result of accounting manipulation.¹⁵

Although the accounting manipulations that Enron used were quite sophisticated, the essence of most of the deceptive transactions was surprisingly simple. Enron sold assets at inflated prices to other firms (or, in many cases, business entities that Enron's CFO Andrew Fastow had created), together with a promise to buy back those assets at an even higher future price. Thus, Enron was effectively borrowing money, receiving cash today in exchange for a promise to pay more cash in the future. But Enron recorded the incoming cash as revenue and then hid the promises to buy them back in a variety of ways.¹⁶ In the end, much of Enron's revenue growth and profits in the late 1990s were the result of this type of manipulation.

WorldCom

Enron's record as the largest bankruptcy of all time lasted only until July 21, 2002, when WorldCom, which at its peak had a market capitalization of \$120 billion, filed for bankruptcy. Again, a series of accounting manipulations beginning in 1998 hid the firm's financial problems from investors.

In WorldCom's case, the fraud was to reclassify \$3.85 billion in operating expenses as long-term capital expenditures. The immediate impact of this change was to boost

¹⁵John R. Kroger, "Enron, Fraud and Securities Reform: An Enron Prosecutor's Perspective," *University of Colorado Law Review* (December 2009): pp. 57–138.

¹⁶In some cases, these promises were called "price risk management liabilities" and hidden with other trading activities; in other cases they were off-balance sheet transactions that were not fully disclosed.

WorldCom's reported earnings: Operating expenses are deducted from earnings immediately, whereas capital expenditures are depreciated slowly over time. Of course, this manipulation would not boost WorldCom's cash flows, because long-term investments must be deducted on the cash flow statement at the time they are made.

Some investors were concerned by WorldCom's excessive investment compared to the rest of the industry. As one investment advisor commented, "Red flags [were] things like big deviations between reported earnings and excess cash flow . . . [and] excessive capital expenditures for a long period of time. That was what got us out of WorldCom in 1999."¹⁷

Sarbanes-Oxley Act

The Enron and Worldcom scandals had an immediate and tangible impact on the accounting world. Both firms had been audited by the same accounting firm, Arthur Andersen, and accusations began to emerge about their business practices in late 2001. By March 2002, Arthur Andersen was indicted on charges following from the Enron case, and it was convicted in June. With its reputation destroyed, the firm quickly collapsed, leaving its clients to find new auditors. These new auditors had a strong incentive to "clean house" and as a result new instances of errors and/or outright fraud were uncovered. Professors Alexander Dyck, Adair Morse, and Luigi Zingales used this event to estimate that nearly 15% of firms may have engaged in some form of financial misrepresentation, and that such fraud costs investors on average 22% of the firm's enterprise value.¹⁸

In an attempt to improve the reliability of financial reporting and corporate governance, Congress passed the Sarbanes-Oxley Act (SOX) in 2002. While SOX contains many provisions, the overall intent of the legislation was to improve the accuracy of information given to both boards and shareholders. SOX attempted to achieve this goal in three ways: (1) by overhauling incentives and the independence in the auditing process, (2) by stiffening penalties for providing false information, and (3) by forcing companies to validate their internal financial control processes.

Because auditors often have a long-standing relationship with their clients and receive lucrative auditing and consulting fees from them, their desire to continue earning these fees may make auditors less willing to challenge management. SOX addressed this concern by putting strict limits on the amount of non-audit fees (consulting or otherwise) that an accounting firm can earn from a company that it audits. It also required that audit partners rotate every five years to limit the likelihood that auditing relationships become too cozy over long periods of time. Finally, SOX called on the SEC to force companies to have audit committees that are dominated by outside directors, with at least one outside director having a financial background.

SOX also stiffened the criminal penalties for providing false information to shareholders (fines of up to \$5 million and up to 20 years imprisonment), and required both the CEO and CFO to personally attest to the accuracy of the firm's financial statements. Furthermore, CEOs and CFOs must return bonuses or profits from the sale of stock that are later shown to be due to misstated financial reports.

Finally, Section 404 of SOX requires senior management and the boards of public companies to validate and certify the process through which funds are allocated and controlled, and outcomes are monitored. Section 404 has arguably garnered more attention than any other section in SOX because of the large potential compliance costs that it places on firms.

¹⁷Robert Olstein, as reported in the *Wall Street Journal*, August 23, 2002.

¹⁸See "How Pervasive Is Corporate Fraud?" Rotman School of Management Working Paper No. 2222608, 2013.

GLOBAL FINANCIAL CRISIS

Bernard Madoff's Ponzi Scheme

"It's only when the tide goes out that you learn who's been swimming naked."
—Warren Buffett

On December 11, 2008, federal agents arrested Bernie Madoff, one of the largest and most successful hedge fund managers. It turned out that the \$65 billion¹⁹ fund he ran was in fact a fraud. His spectacular performance of the last 17 years, generating consistent annual returns between 10% and 15%, was actually a complete fabrication. Madoff had been running the world's largest Ponzi scheme: That is, he used the capital contributed by new investors to pay off old investors. His strategy was so successful that for more than a decade investors ranging from Steven Spielberg to New York University, as well as a number of large banks and investment advisors, lined up to invest with him. Indeed, Madoff quite likely would have been able to hide the fraud until his deathbed had not the global financial crisis spurred many investors to seek to withdraw funds from their Madoff accounts in order to raise cash and cover losses elsewhere in their portfolios. In addition, the financial crisis meant there were few new investors with both the cash and the willingness to invest. As a result, Madoff did not have enough new

capital to pay off the investors who wanted to withdraw their capital, and the scheme finally collapsed.*

How was Madoff able to hide perhaps the largest fraud of all time for so long? Rather than simply manipulate his accounting statements, Madoff *made them up* with the assistance of a virtually unknown accounting firm with only one active accountant. Although many investors may have questioned why such a large fund, with \$65 billion in assets, would choose an unknown and tiny audit firm, not enough of them recognized this choice as a potential red flag. In addition, because Madoff's firm was private, it was not subject to the strict regulatory requirements for public companies (such as the Sarbanes-Oxley Act) and so had weak reporting requirements. As this case makes clear, when making an investment decision, it is important not only to review the firm's financial statements, but also to consider the reliability and reputation of the auditors who prepared them.

*For reasons why fraud may be more likely to occur in booms, and then exposed in downturns, see P. Povel, R. Singh, and A. Winton, "Booms, Busts, and Fraud," *Review of Financial Studies* 20 (2007): 1219–1254.

These costs can be especially significant (in percentage terms) for small companies, and critics have argued that they are sufficiently onerous to cause some firms to avoid them by remaining privately held.²⁰

Dodd-Frank Act

To mitigate the compliance burden on small firms, the Dodd-Frank Wall Street Reform and Consumer Protection Act passed in 2010 exempts firms with less than \$75 million in publicly held shares from the SOX Section 404 requirements. It also requires the SEC to study how it might reduce cost for medium-sized firms with a public float of less than \$250 million, and to assess whether such measures would encourage more firms to list on U.S. exchanges.

Dodd-Frank also broadened the whistleblower provisions of SOX, so that an individual who provides "information related to a possible violation of the federal securities laws (including any rules or regulations thereunder)" that results in penalties or recoveries by the SEC or agencies is eligible to receive from 10 to 30% of that penalty or recovery.

CONCEPT CHECK

1. Describe the transactions Enron used to increase its reported earnings.
2. What is the Sarbanes-Oxley Act, and how was it modified by the Dodd-Frank Act?

¹⁹\$65 billion is the total amount Madoff had reported to his investors, including (fictitious) returns; investigators are still trying to determine the exact amount that investors had actually contributed to the fund, but it appears to be in excess of \$17 billion (see www.madofftrustee.com).

²⁰See Chapter 29 for a more detailed discussion of these and other corporate governance issues.

2.1 Firms' Disclosure of Financial Information

- Financial statements are accounting reports that a firm issues periodically to describe its past performance.
- Investors, financial analysts, managers, and other interested parties such as creditors rely on financial statements to obtain reliable information about a corporation.
- The four required financial statements are the balance sheet, the income statement, the statement of cash flows, and the statement of stockholders' equity.

2.2 The Balance Sheet

- The balance sheet shows the current financial position (assets, liabilities, and stockholders' equity) of the firm at a single point in time.
- The two sides of the balance sheet must balance:

$$\text{Assets} = \text{Liabilities} + \text{Stockholders' Equity} \quad (2.1)$$

- The firm's net working capital, which is the capital available in the short term to run the business, is the difference between the firm's current assets and current liabilities. Excluding cash and debt, key components of net working capital are accounts receivable, inventory, and accounts payable.
- Many assets (such as property, plant, and equipment) are listed on the firm's balance sheet based on their historical cost rather than their current market value, whereas other assets (such as customer relationships) are not listed at all.
- Stockholders' equity is the book value of the firm's equity. It differs from market value of the firm's equity, its market capitalization, because of the way assets and liabilities are recorded for accounting purposes. A successful firm's market-to-book ratio typically exceeds 1.
- The enterprise value of a firm is the total value of its underlying business operations:

$$\text{Enterprise Value} = \text{Market Value of Equity} + \text{Debt} - \text{Cash} \quad (2.4)$$

2.3 The Income Statement

- The income statement reports the firm's revenues and expenses, and it computes the firm's bottom line of net income, or earnings, over a given time interval.
- The firm's operating income is equal to its revenues less its cost of goods sold and operating expenses. After adjusting for other, non-operating income or expenses, we have the firm's earnings before interest and taxes, or EBIT.
- Deducting interest and taxes from EBIT gives the firm's net income, which we can divide by the number of shares outstanding to calculate earnings per share (EPS).

2.4 The Statement of Cash Flows

- The statement of cash flows reports the sources and uses of the firm's cash during a given time period, and can be derived from the firm's income statement and the changes in the firm's balance sheet.
- The statement of cash flows shows the cash used (or provided) from operating, investing, and financing activities.

2.5 Other Financial Statement Information

- The change in stockholders' equity can be computed as retained earnings (net income less dividends) plus net sales of stock (new grants or issuances, net of repurchases).
- The management discussion and analysis section of the financial statements contains management's overview of the firm's performance, as well as disclosure of risks the firm faces, including those from off-balance sheet transactions.

- The notes to a firm's financial statements generally contain important details regarding the numbers used in the main statements.

2.6 Financial Statement Analysis

- Financial ratios allow us to (i) compare the firm's performance over time, and (ii) compare the firm to other similar firms.
- Key financial ratios measure the firm's profitability, liquidity, working capital, interest coverage, leverage, valuation, and operating returns. See Table 2.4 for a summary.
- EBITDA measures the cash a firm generates before capital investments:

$$\text{EBITDA} = \text{EBIT} + \text{Depreciation and Amortization} \quad (2.14)$$

- Net debt measures the firm's debt in excess of its cash reserves:

$$\text{Net Debt} = \text{Total Debt} - \text{Excess Cash \& Short-term Investments} \quad (2.17)$$

- The DuPont Identity expresses a firm's ROE in terms of its profitability, asset efficiency, and leverage:

$$\text{ROE} = \underbrace{\left(\frac{\text{Net Income}}{\text{Sales}} \right)}_{\text{Net Profit Margin}} \times \underbrace{\left(\frac{\text{Sales}}{\text{Total Assets}} \right)}_{\text{Asset Turnover}} \times \underbrace{\left(\frac{\text{Total Assets}}{\text{Book Value of Equity}} \right)}_{\text{Equity Multiplier}} \quad (2.23)$$

2.7 Financial Reporting in Practice

- Recent accounting scandals have drawn attention to the importance of financial statements. New legislation has increased the penalties for fraud and tightened the procedures firms must use to assure that statements are accurate.

Key Terms

10-K <i>p.</i> 56	debt-to-enterprise value ratio <i>p.</i> 74
10-Q <i>p.</i> 56	deferred taxes <i>p.</i> 60
accounts payable <i>p.</i> 60	depreciation expense <i>p.</i> 59
accounts payable days <i>p.</i> 72	diluted EPS <i>p.</i> 64
accounts payable turnover <i>p.</i> 72	dilution <i>p.</i> 64
accounts receivable <i>p.</i> 59	DuPont Identity <i>p.</i> 78
accounts receivable days <i>p.</i> 72	earnings per share (EPS) <i>p.</i> 64
accounts receivable turnover <i>p.</i> 72	EBIT <i>p.</i> 64
accumulated depreciation <i>p.</i> 59	EBIT margin <i>p.</i> 69
amortization <i>p.</i> 60	EBITDA <i>p.</i> 73
annual report <i>p.</i> 56	enterprise value <i>p.</i> 62
asset turnover <i>p.</i> 78	equity multiplier <i>p.</i> 75
assets <i>p.</i> 58	financial statements <i>p.</i> 56
auditor <i>p.</i> 56	Generally Accepted Accounting Principles (GAAP) <i>p.</i> 56
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Further Reading

For a basic primer on financial statements, see T. R. Ittelson, *Financial Statements: A Step-By-Step Guide to Understanding and Creating Financial Reports* (Career Press, 2009).

For additional information on financial accounting, there are many introductory, MBA-level financial accounting textbooks. See T. Dyckman, R. Magee, and G. Pfeiffer, *Financial Accounting* (Cambridge Business Publishers, 2010); and W. Harrison, C. Horngren, and C. W. Thomas, *Financial Accounting* (Prentice Hall, 2013).

For more on financial statement analysis, see J. Whalen, S. Baginski, and M. Bradshaw, *Financial Reporting, Financial Statement Analysis and Valuation: A Strategic Perspective* (South-Western College Pub, 2010); and L. Revsine, D. Collins, B. Johnson, F. Mittelstaedt, *Financial Reporting & Analysis* (McGraw-Hill/Irwin, 2011).

A great deal of public information is available regarding the alleged accounting abuses at Enron Corporation. A useful starting point is a report produced by a committee established by Enron's own board of directors: Report of the Special Investigative Committee of the Board of Directors of Enron (Powers Report), released February 2, 2002 (available online). Information regarding the resolution of Bernard Madoff's Ponzi scheme can be found on the site published by the Securities Investor Protection Act (SIPA) Trustee, www.madofftrustee.com.

For an estimate of the frequency and cost of accounting fraud, see A. Dyck, A. Morse, and L. Zingales, "How Pervasive Is Corporate Fraud?" Rotman School of Management Working Paper No. 2222608, 2013.

Problems

All problems are available in [MyFinanceLab](#). An asterisk (*) indicates problems with a higher level of difficulty.

Firms' Disclosure of Financial Information

1. What four financial statements can be found in a firm's 10-K filing? What checks are there on the accuracy of these statements?
2. Who reads financial statements? List at least three different categories of people. For each category, provide an example of the type of information they might be interested in and discuss why.
3. Find the most recent financial statements for Starbucks Corporation (SBUX) using the following sources:
 - a. From the company's Web page www.starbucks.com. (*Hint:* Search for "investor relations.")
 - b. From the SEC Web site www.sec.gov. (*Hint:* Search for company filings in the EDGAR database.)

- c. From the Yahoo! Finance Web site finance.yahoo.com.
- d. From at least one other source. (*Hint:* Enter “SBUX 10K” at www.google.com.)

The Balance Sheet

4. Consider the following potential events that might have taken place at Global Conglomerate on December 30, 2015. For each one, indicate which line items in Global’s balance sheet would be affected and by how much. Also indicate the change to Global’s book value of equity. (In all cases, ignore any tax consequences for simplicity.)
 - a. Global used \$20 million of its available cash to repay \$20 million of its long-term debt.
 - b. A warehouse fire destroyed \$5 million worth of uninsured inventory.
 - c. Global used \$5 million in cash and \$5 million in new long-term debt to purchase a \$10 million building.
 - d. A large customer owing \$3 million for products it already received declared bankruptcy, leaving no possibility that Global would ever receive payment.
 - e. Global’s engineers discover a new manufacturing process that will cut the cost of its flagship product by over 50%.
 - f. A key competitor announces a radical new pricing policy that will drastically undercut Global’s prices.
5. What was the change in Global Conglomerate’s book value of equity from 2014 to 2015 according to Table 2.1? Does this imply that the market price of Global’s shares increased in 2015? Explain.
6. Use EDGAR to find Qualcomm’s 10K filing for 2015. From the balance sheet, answer the following questions:
 - a. How much did Qualcomm have in cash, cash equivalents, and marketable securities (short- and long-term)?
 - b. What were Qualcomm’s total accounts receivable?
 - c. What were Qualcomm’s total assets?
 - d. What were Qualcomm’s total liabilities? How much of this was long-term debt?
 - e. What was the book value of Qualcomm’s equity?
7. Find online the annual 10-K report for Costco Wholesale Corporation (COST) for fiscal year 2015 (filed in October 2015). Answer the following questions from their balance sheet:
 - a. How much cash did Costco have at the end of the fiscal year?
 - b. What were Costco’s total assets?
 - c. What were Costco’s total liabilities? How much debt did Costco have?
 - d. What was the book value of Costco equity?
8. In early 2012, General Electric (GE) had a book value of equity of \$109 billion, 10.3 billion shares outstanding, and a market price of \$9.66 per share. GE also had cash of \$40 billion, and total debt of \$530 billion. Three years later, in early 2015, GE had a book value of equity of \$112 billion, 10.9 billion shares outstanding with a market price of \$16.59 per share, cash of \$85 billion, and total debt of \$417 billion. Over this period, what was the change in GE’s
 - a. market capitalization?
 - b. market-to-book ratio?
 - c. enterprise value?
9. In early-2015, Abercrombie & Fitch (ANF) had a book equity of \$1390 million, a price per share of \$25.52, and 69.35 million shares outstanding. At the same time, The Gap (GPS) had a book equity of \$2983 million, a share price of \$41.19, and 421 million shares outstanding.
 - a. What is the market-to-book ratio of each of these clothing retailers?
 - b. What conclusions can you draw by comparing the two ratios?
10. See Table 2.5 showing financial statement data and stock price data for Mydeco Corp.
 - a. What is Mydeco’s market capitalization at the end of each year?
 - b. What is Mydeco’s market-to-book ratio at the end of each year?
 - c. What is Mydeco’s enterprise value at the end of each year?



TABLE 2.5**2012–2016 Financial Statement Data and Stock Price Data for Mydeco Corp.**

Mydeco Corp. 2012–2016		(All data as of fiscal year end; in \$ million)			
Income Statement	2012	2013	2014	2015	2016
Revenue	401.9	361.6	429.6	513.6	602.6
Cost of Goods Sold	(192.1)	(175.4)	(207.1)	(248.3)	(295.8)
Gross Profit	209.8	186.2	222.5	265.3	306.8
Sales and Marketing	(65.0)	(64.4)	(84.3)	(104.9)	(121.1)
Administration	(61.8)	(57.1)	(59.0)	(66.9)	(79.8)
Depreciation & Amortization	(27.5)	(26.3)	(32.5)	(38.3)	(40.1)
EBIT	55.5	38.4	46.7	55.2	65.8
Interest Income (Expense)	(32.4)	(31.8)	(32.0)	(37.0)	(40.9)
Pretax Income	23.1	6.6	14.7	18.2	24.9
Income Tax	(8.1)	(2.3)	(5.1)	(6.4)	(8.7)
Net Income	15.0	4.3	9.6	11.8	16.2
<i>Shares outstanding (millions)</i>	56.8	56.8	56.8	56.8	56.8
<i>Earnings per share</i>	\$0.26	\$0.08	\$0.17	\$0.21	\$0.29
Balance Sheet	2012	2013	2014	2015	2016
<i>Assets</i>					
Cash	49.4	68.0	91.7	80.4	83.6
Accounts Receivable	87.6	70.6	69.3	77.4	84.2
Inventory	33.5	32.2	27.3	30.2	35.8
Total Current Assets	170.5	170.8	188.3	188.0	203.6
Net Property, Plant & Equip.	244.3	243.3	306.1	349.6	347.9
Goodwill & Intangibles	365.5	365.5	365.5	365.5	365.5
Total Assets	780.3	779.6	859.9	903.1	917.0
<i>Liabilities & Stockholders' Equity</i>					
Accounts Payable	18.8	18.8	22.4	27.1	30.3
Accrued Compensation	7.6	6.3	7.5	7.7	9.4
Total Current Liabilities	26.4	25.1	29.9	34.8	39.7
Long-term Debt	498.9	498.9	572.2	597.5	597.5
Total Liabilities	525.3	524	602.1	632.3	637.2
Stockholders' Equity	255.0	255.6	257.8	270.8	279.8
Total Liabilities & Stockholders' Equity	780.3	779.6	859.9	903.1	917.0
Statement of Cash Flows	2012	2013	2014	2015	2016
Net Income	15.0	4.3	9.6	11.8	16.2
Depreciation & Amortization	27.5	26.3	32.5	38.3	40.1
Chg. in Accounts Receivable	3.9	17.0	1.3	(8.1)	(6.8)
Chg. in Inventory	(2.9)	1.3	4.9	(2.9)	(5.6)
Chg. in Payables & Accrued Comp.	1.7	(1.3)	4.8	4.9	4.9
Cash from Operations	45.2	47.6	53.1	44.0	48.8
Capital Expenditures	(26.6)	(23.8)	(97.5)	(75.4)	(40.0)
Cash from Investing Activities	(26.6)	(23.8)	(97.5)	(75.4)	(40.0)
Dividends Paid	(5.2)	(5.2)	(5.2)	(5.2)	(5.6)
Sale (or purchase) of stock	—	—	—	—	—
Debt Issuance (Pay Down)	—	—	73.3	25.3	—
Cash from Financing Activities	(5.2)	(5.2)	68.1	20.1	(5.6)
Change in Cash	13.4	18.6	23.7	(11.3)	3.2
<i>Mydeco Stock Price</i>	\$7.02	\$3.55	\$5.86	\$8.33	\$11.57

The Income Statement



11. Suppose that in 2016, Global launches an aggressive marketing campaign that boosts sales by 15%. However, their operating margin falls from 5.57% to 4.50%. Suppose that they have no other income, interest expenses are unchanged, and taxes are the same percentage of pretax income as in 2015.
 - a. What is Global's EBIT in 2016?
 - b. What is Global's net income in 2016?
 - c. If Global's P/E ratio and number of shares outstanding remains unchanged, what is Global's share price in 2016?
12. Find online the annual 10-K report for Costco Wholesale Corporation (COST) for fiscal year 2015 (filed in October 2015). Answer the following questions from their income statement:
 - a. What were Costco's revenues for fiscal year 2015? By what percentage did revenues grow from the prior year?
 - b. What was Costco's operating income for the fiscal year?
 - c. What was Costco's average tax rate for the year?
 - d. What were Costco's diluted earnings per share in fiscal year 2015? What number of shares is this EPS based on?



13. See Table 2.5 showing financial statement data and stock price data for Mydeco Corp.
 - a. By what percentage did Mydeco's revenues grow each year from 2013 to 2016?
 - b. By what percentage did net income grow each year?
 - c. Why might the growth rates of revenues and net income differ?
14. See Table 2.5 showing financial statement data and stock price data for Mydeco Corp. Suppose Mydeco repurchases 2.3 million shares each year from 2013 to 2016. What would its earnings per share be in years 2013–2016? (Assume Mydeco pays for the shares using its available cash and that Mydeco earns no interest on its cash balances.)



15. See Table 2.5 showing financial statement data and stock price data for Mydeco Corp. Suppose Mydeco had purchased additional equipment for \$12.3 million at the end of 2013, and this equipment was depreciated by \$4.1 million per year in 2014, 2015, and 2016. Given Mydeco's tax rate of 35%, what impact would this additional purchase have had on Mydeco's net income in years 2013–2016? (Assume the equipment is paid for out of cash and that Mydeco earns no interest on its cash balances.)



16. See Table 2.5 showing financial statement data and stock price data for Mydeco Corp. Suppose Mydeco's costs and expenses had been the same fraction of revenues in 2013–2016 as they were in 2012. What would Mydeco's EPS have been each year in this case?



17. Suppose a firm's tax rate is 30%.
 - a. What effect would a \$10 million operating expense have on this year's earnings? What effect would it have on next year's earnings?
 - b. What effect would a \$10 million capital expense have on this year's earnings if the capital expenditure is depreciated at a rate of \$2 million per year for five years? What effect would it have on next year's earnings?
- *18. Quisco Systems has 6.17 billion shares outstanding and a share price of \$18.96. Quisco is considering developing a new networking product in-house at a cost of \$509 million. Alternatively, Quisco can acquire a firm that already has the technology for \$893 million worth (at the current price) of Quisco stock. Suppose that absent the expense of the new technology, Quisco will have EPS of \$0.83.
 - a. Suppose Quisco develops the product in-house. What impact would the development cost have on Quisco's EPS? Assume all costs are incurred this year and are treated as an R&D expense, Quisco's tax rate is 35%, and the number of shares outstanding is unchanged.
 - b. Suppose Quisco does not develop the product in-house but instead acquires the technology. What effect would the acquisition have on Quisco's EPS this year? (Note that acquisition expenses do not appear directly on the income statement. Assume the firm was acquired at the start of the year and has no revenues or expenses of its own, so that the only effect on EPS is due to the change in the number of shares outstanding.)

- c. Which method of acquiring the technology has a smaller impact on earnings? Is this method cheaper? Explain.

The Statement of Cash Flows

19. Find online the annual 10-K report for Costco Wholesale Corporation (COST) for fiscal year 2015 (filed in October 2015). Answer the following questions from their cash flow statement:
- How much cash did Costco generate from operating activities in fiscal year 2015?
 - What was Costco's total depreciation and amortization expense?
 - How much cash was invested in new property and equipment (net of any sales)?
 - How much did Costco raise from the sale of shares of its stock (net of any purchases)?



20. See Table 2.5 showing financial statement data and stock price data for Mydeco Corp.
- From 2012 to 2016, what was the total cash flow from operations that Mydeco generated?
 - What fraction of the total in (a) was spent on capital expenditures?
 - What fraction of the total in (a) was spent paying dividends to shareholders?
 - What was Mydeco's total retained earnings for this period?
21. See Table 2.5 showing financial statement data and stock price data for Mydeco Corp.
- In what year was Mydeco's net income the lowest?
 - In what year did Mydeco need to reduce its cash reserves?
 - Why did Mydeco need to reduce its cash reserves in a year when net income was reasonably high?
22. See Table 2.5 showing financial statement data and stock price data for Mydeco Corp. Use the data from the balance sheet and cash flow statement in 2012 to determine the following:
- How much cash did Mydeco have at the end of 2011?
 - What were Mydeco's accounts receivable and inventory at the end of 2011?
 - What were Mydeco's total liabilities at the end of 2011?
 - Assuming goodwill and intangibles were equal in 2011 and 2012, what was Mydeco's net property, plant, and equipment at the end of 2011?
23. Can a firm with positive net income run out of cash? Explain.
24. Suppose your firm receives a \$4.1 million order on the last day of the year. You fill the order with \$2.9 million worth of inventory. The customer picks up the entire order the same day and pays \$1.5 million upfront in cash; you also issue a bill for the customer to pay the remaining balance of \$2.6 million in 30 days. Suppose your firm's tax rate is 0% (i.e., ignore taxes). Determine the consequences of this transaction for each of the following:
- Revenues
 - Earnings
 - Receivables
 - Inventory
 - Cash
25. Nokela Industries purchases a \$38.5 million cyclo-converter. The cyclo-converter will be depreciated by \$7.7 million per year over five years, starting this year. Suppose Nokela's tax rate is 40%.
- What impact will the cost of the purchase have on earnings for each of the next five years?
 - What impact will the cost of the purchase have on the firm's cash flow for the next five years?

Other Financial Statement Information

26. See Table 2.5 showing financial statement data and stock price data for Mydeco Corp.
- What were Mydeco's retained earnings each year?
 - Using the data from 2012, what was Mydeco's total stockholders' equity in 2011?
27. Find online the annual 10-K report for Costco Wholesale Corporation (COST) for fiscal year 2015 (filed in October 2015). Answer the following questions from the notes to their financial statements:
- How many stores did Costco open outside of the U.S. in 2015?
 - What property does Costco lease? What are the minimum lease payments due in 2016?
 - What was Costco's worldwide member renewal rate for 2015? What proportion of Costco cardholders had Gold Star memberships in 2015?
 - What fraction of Costco's 2015 sales came from gas stations, pharmacy, food court, and optical? What fraction came from apparel and small appliances?

Financial Statement Analysis

28. See Table 2.5 showing financial statement data and stock price data for Mydeco Corp.
 - a. What were Mydeco's gross margins each year?
 - b. Comparing Mydeco's gross margin, EBIT margin, and net profit margin in 2012 to 2016, which margins improved?
29. For fiscal year end 2015, Wal-Mart Stores, Inc. (WMT, brand name Walmart) had revenues of \$485.65 billion, gross profit of \$120.57 billion, and net income of \$16.36 billion. Costco Wholesale Corporation (COST) had revenue of \$116.20 billion, gross profit of \$15.13 billion, and net income of \$2.38 billion.
 - a. Compare the gross margins for Walmart and Costco.
 - b. Compare the net profit margins for Walmart and Costco.
 - c. Which firm was more profitable in 2015?
30. At the end of 2015, Apple had cash and short-term investments of \$41.60 billion, accounts receivable of \$35.89 billion, current assets of \$89.38 billion, and current liabilities of \$80.61 billion.
 - a. What was Apple's current ratio?
 - b. What was Apple's quick ratio?
 - c. What was Apple's cash ratio?
 - d. At the end of 2015, HPQ had a cash ratio of 0.35, a quick ratio of 0.73 and a current ratio of 1.15. What can you say about the asset liquidity of Apple relative to HPQ?
31. See Table 2.5 showing financial statement data and stock price data for Mydeco Corp.
 - a. How did Mydeco's accounts receivable days change over this period?
 - b. How did Mydeco's inventory days change over this period?
 - c. Based on your analysis, has Mydeco improved its management of its working capital during this time period?
32. See Table 2.5 showing financial statement data and stock price data for Mydeco Corp.
 - a. Compare accounts payable days in 2012 and 2016.
 - b. Did this change in accounts payable days improve or worsen Mydeco's cash position in 2016?
33. See Table 2.5 showing financial statement data and stock price data for Mydeco Corp.
 - a. By how much did Mydeco increase its debt from 2012 to 2016?
 - b. What was Mydeco's EBITDA/Interest coverage ratio in 2012 and 2016? Did its coverage ratio ever fall below 2?
 - c. Overall, did Mydeco's ability to meet its interest payments improve or decline over this period?
34. See Table 2.5 showing financial statement data and stock price data for Mydeco Corp.
 - a. How did Mydeco's book debt-equity ratio change from 2012 to 2016?
 - b. How did Mydeco's market debt-equity ratio change from 2012 to 2016?
 - c. Compute Mydeco's debt-to-enterprise value ratio to assess how the fraction of its business that is debt financed has changed over the period.
35. Use the data in Problem 8 to determine the change, from 2012 to 2015, in GE's
 - a. book debt-equity ratio.
 - b. market debt-equity ratio.
36. You are analyzing the leverage of two firms and you note the following (all values in millions of dollars):

	Debt	Book Equity	Market Equity	EBIT	Interest Expense
Firm A	495.8	297.7	401.1	106.8	45.2
Firm B	83.8	38.3	35.9	8.4	7.5

- a. What is the market debt-to-equity ratio of each firm?
- b. What is the book debt-to-equity ratio of each firm?
- c. What is the interest coverage ratio of each firm?
- d. Which firm may have more difficulty meeting its debt obligations? Explain.

37. See Table 2.5 showing financial statement data and stock price data for Mydeco Corp.
- Compute Mydeco's PE ratio each year from 2012 to 2016. In which year was it the highest?
 - What was Mydeco's Enterprise Value to EBITDA ratio each year? In which year was it the highest?
 - What might explain the differing time pattern of the two valuation ratios?
38. In early-2015, United Airlines (UAL) had a market capitalization of \$24.8 billion, debt of \$12.8 billion, and cash of \$5.5 billion. United also had annual revenues of \$38.9 billion. Southwest Airlines (LUV) had a market capitalization of \$28.8 billion, debt of \$2.7 billion, cash of \$2.9 billion, and annual revenues of \$18.6 billion.
- Compare the market capitalization-to-revenue ratio (also called the price-to-sales ratio) for United Airlines and Southwest Airlines.
 - Compare the enterprise value-to-revenue ratio for United Airlines and Southwest Airlines.
 - Which of these comparisons is more meaningful? Explain.
39. See Table 2.5 showing financial statement data and stock price data for Mydeco Corp.
- Compute Mydeco's ROE each year from 2012 to 2016.
 - Compute Mydeco's ROA each year from 2012 to 2016.
 - Which return is more volatile? Why?
40. See Table 2.5 showing financial statement data and stock price data for Mydeco Corp. Was Mydeco able to improve its ROIC in 2016 relative to what it was in 2012?
41. For fiscal year 2015, Costco Wholesale Corporation (COST) had a net profit margin of 2.05%, asset turnover of 3.48, and a book equity multiplier of 3.15.
- Use this data to compute Costco's ROE using the DuPont Identity.
 - If Costco's managers wanted to increase its ROE by one percentage point, how much higher would their asset turnover need to be?
 - If Costco's net profit margin fell by one percentage point, by how much would their asset turnover need to increase to maintain their ROE?
42. For fiscal year 2015, Wal-Mart Stores, Inc. (WMT) had total revenues of \$485.65 billion, net income of \$16.36 billion, total assets of \$203.49 billion, and total shareholder's equity of \$81.39 billion.
- Calculate Walmart's ROE directly, and using the DuPont Identity.
 - Comparing with the data for Costco in Problem 41, use the DuPont Identity to understand the difference between the two firms' ROEs.
43. Consider a retailing firm with a net profit margin of 3.1%, a total asset turnover of 1.85, total assets of \$44.4 million, and a book value of equity of \$18.2 million.
- What is the firm's current ROE?
 - If the firm increased its net profit margin to 3.6%, what would be its ROE?
 - If, in addition, the firm increased its revenues by 23% (while maintaining this higher profit margin and without changing its assets or liabilities), what would its ROE be?

Financial Reporting in Practice

44. Find online the annual 10-K report for Costco Wholesale Corporation (COST) for fiscal year 2015 (filed in October 2015).
- Which auditing firm certified these financial statements?
 - Which officers of Costco certified the financial statements?
45. WorldCom reclassified \$3.85 billion of operating expenses as capital expenditures. Explain the effect this reclassification would have on WorldCom's cash flows. (*Hint:* Consider taxes.) WorldCom's actions were illegal and clearly designed to deceive investors. But if a firm could legitimately choose how to classify an expense for tax purposes, which choice is truly better for the firm's investors?

Data Case

This is your second interview with a prestigious brokerage firm for a job as an equity analyst. You survived the morning interviews with the department manager and the Vice President of Equity. Everything has gone so well that they want to test your ability as an analyst. You are seated in a room with a computer and a list with the names of two companies—Ford (F) and Microsoft (MSFT). You have 90 minutes to complete the following tasks:

1. Download the annual income statements, balance sheets, and cash flow statements for the last four fiscal years from MarketWatch (www.morningstar.com). Enter each company's stock symbol and then go to "financials." Export the statements to Excel by clicking the export button.
2. Find historical stock prices for each firm from Yahoo! Finance (finance.yahoo.com). Enter your stock symbol, click "Historical Prices" in the left column, and enter the proper date range to cover the last day of the month corresponding to the date of each financial statement. Use the closing stock prices (not the adjusted close). To calculate the firm's market capitalization at each date, multiply the number of shares outstanding (see "Basic" on the income statement under "Weighted Average Shares Outstanding") by the firm's historic stock price.
3. For each of the four years of statements, compute the following ratios for each firm:

Valuation Ratios

Price-Earnings Ratio (for EPS use Diluted EPS Total)

Market-to-Book Ratio

Enterprise Value-to-EBITDA

(For debt, include long-term and short-term debt; for cash, include marketable securities.)

Profitability Ratios

Operating Margin

Net Profit Margin

Return on Equity

Financial Strength Ratios

Current Ratio

Book Debt-Equity Ratio

Market Debt-Equity Ratio

Interest Coverage Ratio ($\text{EBIT} \div \text{Interest Expense}$)

4. Obtain industry averages for each firm from Reuters.com (www.reuters.com/finance/stocks). Enter the stock symbol in the field under "Search Stocks," select the company from the list, and then click the "Financials" button.
 - a. Compare each firm's ratios to the available industry ratios for the most recent year. (Ignore the "Company" column as your calculations will be different.)
 - b. Analyze the performance of each firm versus the industry and comment on any trends in each individual firm's performance. Identify any strengths or weaknesses you find in each firm.
5. Examine the Market-to-Book ratios you calculated for each firm. Which, if any, of the two firms can be considered "growth firms" and which, if any, can be considered "value firms"?
6. Compare the valuation ratios across the two firms. How do you interpret the difference between them?
7. Consider the enterprise value of each firm for each of the four years. How have the values of each firm changed over the time period?

Note: Updates to this data case may be found at www.berkdemarzo.com.

Financial Decision Making and the Law of One Price

IN MID-2007, MICROSOFT DECIDED TO ENTER A BIDDING WAR with competitors Google and Yahoo! for a stake in the fast-growing social networking site, Facebook. How did Microsoft's managers decide that this was a good decision?

Every decision has future consequences that will affect the value of the firm. These consequences will generally include both benefits and costs. For example, after raising its offer, Microsoft ultimately succeeded in buying a 1.6% stake in Facebook, along with the right to place banner ads on the Facebook Web site, for \$240 million. In addition to the upfront cost of \$240 million, Microsoft also incurred ongoing costs associated with software development for the platform, network infrastructure, and international marketing efforts to attract advertisers. The benefits of the deal to Microsoft included the revenues associated with the advertising sales, together with the appreciation of its 1.6% stake in Facebook. In the end, Microsoft's decision appeared to be a good one—in addition to advertising benefits, by the time of Facebook's IPO in May 2012, the value of Microsoft's 1.6% stake had grown to over \$1 billion.

More generally, a decision is good for the firm's investors if it increases the firm's value by providing benefits whose value exceeds the costs. But comparing costs and benefits is often complicated because they occur at different points in time, may be in different currencies, or may have different risks associated with them. To make a valid comparison, we must use the tools of finance to express all costs and benefits in common terms. In this chapter, we introduce a central principle of finance, which we name the *Valuation Principle*, which states that we can use current market prices to determine the value today of the costs and benefits associated with a decision. This principle allows us to apply the concept of *net present value (NPV)* as a way to compare the costs and benefits of a project in terms of a common unit—namely, dollars today. We will then be able to evaluate a decision by answering this question: *Does the cash value today of its*

NOTATION

NPV net present value

r_f risk-free interest rate

PV present value

benefits exceed the cash value today of its costs? In addition, we will see that the NPV indicates the net amount by which the decision will increase wealth.

We then turn to financial markets and apply these same tools to determine the prices of securities that trade in the market. We discuss strategies called *arbitrage*, which allow us to exploit situations in which the prices of publicly available investment opportunities do not conform to these values. Because investors trade rapidly to take advantage of arbitrage opportunities, we argue that equivalent investment opportunities trading simultaneously in competitive markets must have the same price. This *Law of One Price* is the unifying theme of valuation that we use throughout this text.

3.1 Valuing Decisions

A financial manager's job is to make decisions on behalf of the firm's investors. For example, when faced with an increase in demand for the firm's products, a manager may need to decide whether to raise prices or increase production. If the decision is to raise production and a new facility is required, is it better to rent or purchase the facility? If the facility will be purchased, should the firm pay cash or borrow the funds needed to pay for it?

In this book, our objective is to explain how to make decisions that increase the value of the firm to its investors. In principle, the idea is simple and intuitive: For good decisions, the benefits exceed the costs. Of course, real-world opportunities are usually complex and so the costs and benefits are often difficult to quantify. The analysis will often involve skills from other management disciplines, as in these examples:

Marketing: to forecast the increase in revenues resulting from an advertising campaign

Accounting: to estimate the tax savings from a restructuring

Economics: to determine the increase in demand from lowering the price of a product

Organizational Behavior: to estimate the productivity gains from a change in management structure

Strategy: to predict a competitor's response to a price increase

Operations: to estimate the cost savings from a plant modernization

Once the analysis of these other disciplines has been completed to quantify the costs and benefits associated with a decision, the financial manager must compare the costs and benefits and determine the best decision to make for the value of the firm.

Analyzing Costs and Benefits

The first step in decision making is to identify the costs and benefits of a decision. The next step is to quantify these costs and benefits. In order to compare the costs and benefits, we need to evaluate them in the same terms—cash today. Let's make this concrete with a simple example.

Suppose a jewelry manufacturer has the opportunity to trade 400 ounces of silver for 10 ounces of gold today. Because an ounce of gold differs in value from an ounce of silver, it is incorrect to compare 400 ounces to 10 ounces and conclude that the larger quantity is